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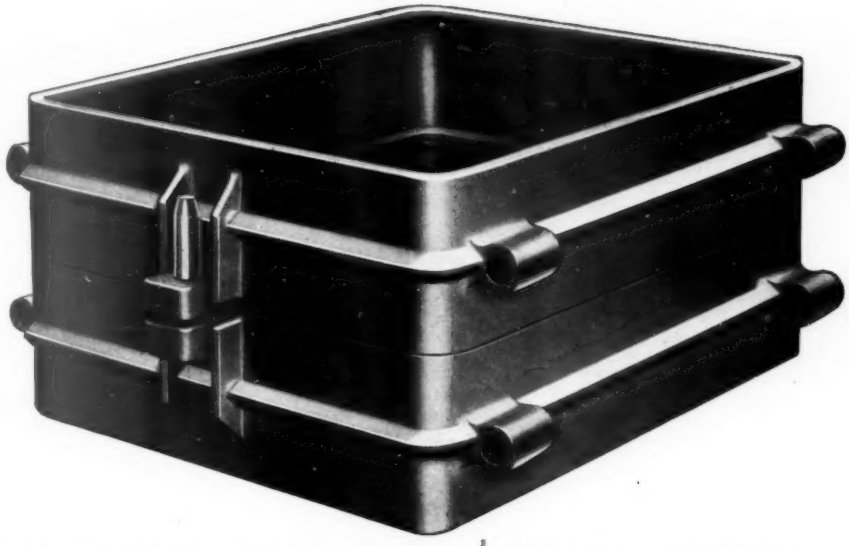

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AUGUST-SIMPSON MIX-MULLERS at the AUSTIN FOUNDRY

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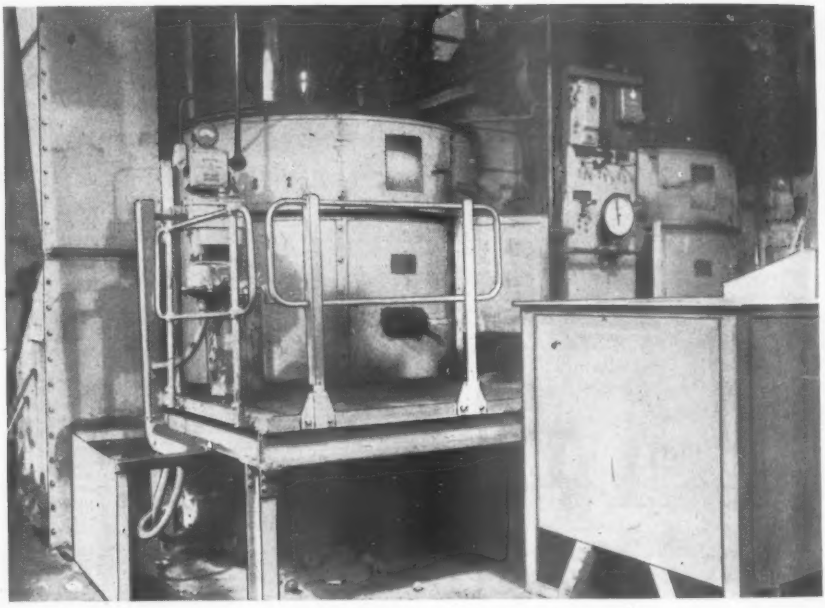

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FOUNDRY
TRADE JOURNAL

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The Export Trade

The Federation of British Industries has recently issued a pamphlet* on Export Trade Facilities, which, confined strictly to its title is quite good, but from the angle of either the foundry industry or its suppliers gives no direct, worthwhile information as to how to increase sales. Possibly a manufacturer of biscuits would take an entirely different view. Quite an important section is given over to the education and training for export management and marketing. The most successful overseas salesmen of capital goods are those who have had a good general education, a profound knowledge of the plant they sell and above all an unbounded belief in its worth. In this booklet there is no section devoted to the Export Credits Department of the Board of Trade. Surely of all export trade facilities this service should appear high on the list, but we are told this was expressly excluded along with other financial considerations. Thus the booklet is devoted to such subjects as advertising, packaging, overseas fairs and the like.

Last week saw the issue of the quarterly G.E.C. Export Guide. This reveals a distinct improvement during the past three months in the prospects for the transaction of overseas trade. It reports that prospects for the forthcoming quarter for 36 groups of products of British exports to 34 countries. The prospects are " good " in 13 countries; " improving " in 8; " deteriorating " in 8 and " bad " in 5. In January there were 9 " good "; 6 " improving "; 10 " deteriorating " and 9 " bad." The Export Guide carries the timely reminder—that UK industry has overcome its inferiority complex as to the possibility of sales to the USA, which is to-day our largest export market, taking no less than £293,000,000 worth of goods or 9 per cent. of all our export trade.

The UK foundry equipment and supplies industry is aware of the value of the export industry and its chief executives have this year visited the USA, Canada, Australia, South Africa (several firms), India, Turkey and Spain. The industry has formed a number of subsidiary companies overseas, supplemented by numerous agencies. The position to-day is that when overseas concerns write to us to be put in touch with foundry-equipment firms or suppliers with a view of establishing agencies, it is difficult to find any that are not already represented. In Europe, however, the position is not so " cut and dried."

---

* Export Trade Facilities—A Report from the Federation of British Industries, 21, Tothill Street, London, S.W.1; price 5s.

Standards Engineers' Conference

Lord Halsbury, president of the Institution of Production Engineers, is to open this year's one-day conference of engineers and others concerned with the application of standards in industry. The conference—the fifth of its kind—will be held on Thursday, June 4, at the Connaught Rooms, London.

The theme of the morning session at the conference will be the significance of standards in the national economy, their application in the individual company and the place and function in the company of the standards engineer. The discussion, to be introduced by speakers from the management side of two different types of firm, will lead to consideration of a paper on the detailed operation of a company standards department.

At the afternoon session speakers from the Institution of Production Engineers and the British Standards Institution will report on the significant trends of their work as it affects standards engineers. A progress report will be submitted from the IPE/BSI committee (which organizes these annual conferences) on matters that have come before previous conferences. It will include a review of the opinions expressed since the last conference on the question of establishing a formal association of standards engineers. Co-operation between the standards, design, and the purchasing departments in firms will be discussed with particular reference to making British Standards more readily usable as purchasing specifications.

Applications for tickets (35s. each) should be sent (at latest by May 21) to the secretariat, IPE/BSI committee, British Standards House, 2, Park Street, London, W.1.

Dinners

INSTITUTE OF METALS

Last week the Institute of Metals held its annual dinner/dance at Grosvenor House, London, the chairman being Mr. G. L. Bailey, C.B.E., M.SC., president of the Institute. Following the loyal toast, Mr. W. H. McFadzean, president of the Federation of British Industries, proposed "The Institute of Metals and the Non-ferrous Metal Industries," and Mr. Bailey responded. The toast to "The Guests" was proposed by Prof. H. O'Neill, M.MET., D.SC., the reply being made by Sir Harry Melville, K.C.B., F.R.S. Other guests at the high table included Prof. L. Aitchison; Mr. W. E. Ballard; Dr. Maurice Cook; Vice-Admiral N. E. Dalton; Mr. J. B. Dennison; Prof. Hugh Ford; Dr. T. P. Hoar; Dr. B. Lunn; Dr. L. B. Pfeil; Mr. R. Reitsema; and Dr. G. B. B. M. Sutherland, most of whom were accompanied by their ladies. At the conclusion of the dinner there was dancing until 1 a.m.

SILICA AND MOULDING SANDS ASSOCIATION

The annual dinner of the Silica and Moulding Sands Association was held at the Savoy Hotel, London, last Wednesday week, under the chairmanship of Mr. R. Hadfield, the president-elect. The speeches from Sir Harry Pilkington, the chairman, Mr. T. Watson and Mr. Barrington Hooper were of a very high order, mixing sound commonsense with sparkling humour. Entertainment was provided by the Trio Valli and was uncommonly good.

SHEFFIELD'S NEW ASSAY OFFICE building in Portobello Street was opened on April 13 by the Lord Mayor of Sheffield, Alderman J. W. Holland.

Forthcoming Events

APRIL 27

Institute of British Foundrymen

Sheffield branch:—Annual general meeting followed by "Question and Answer" session, 7 p.m., at the College of Commerce and Technology, Pond Street.

APRIL 28

Institute of Vitreous Enamellers

Scottish section:—Works visit to British Aluminium Company, Limited.

Combustion Engineering Association

Western region:—One-day meeting at the Seabank Hotel, Porthcawl, Glamorgan: 11 a.m., "Brains Trust" on "Working of the Clean Air Act," and at 2.15 p.m., "Structural Insulation," by P. E. Millington.

APRIL 29

Institute of British Foundrymen

Southampton section:—Annual general meeting followed by "Application of Automatic Controls to Mould Production in Fully- and Semi-mechanized Foundries," by J. A. Hufton, 7.30 p.m., at the Technical College, St. Mary's Street.

Institute of Metals

Powder Metallurgy Joint Group:—Series of papers on "Theoretical Aspects of Sintering," 9.30 a.m., at Church House, Great Smith Street, Westminster, London, S.W.1.

APRIL 30

Institution of Plant Engineers

Sheffield and district branch:—"Metal Stitching," by N. Tinwell, 7.30 p.m., at the Grand Hotel, Sheffield.

MAY 1

Institute of British Foundrymen

East Midlands branch:—Annual dinner/dance. (Details from secretary.)

F. H. Lloyd hold "Open House"

F. H. Lloyd & Company, Limited, steelfounders and engineers, are inviting customers and special guests to an "open house" at their James Bridge Steel Works, near Wednesbury, Staffs, on May 7 and 8. The proceedings will follow the same pattern on both days, commencing with a reception and exhibition of foundry and engineering products, followed after luncheon by a tour of the works. Points of interest will be the new patternshop—said to be one of the largest and most modern in the Midlands—the light and heavy foundries, and fettling and machine shops. The latter has recently been extended and is now amongst the best-equipped in the country for heavy jobbing work.

Latest Foundry Statistics

Ironfounding: The Council of Ironfoundry Associations states that during the week ending February 28, 125,022 ironfoundry workers were employed in the United Kingdom, and of these 116,540 were males and 8,482 were females. The corresponding earlier figures were 137,652 at March 1, 1958, and 125,250 at the end of January this year.

AN ORDER for a continuous malleablizing plant for production of ferritic and pearlitic blackheart malleable has been received by Metalectric Furnaces, Limited, Smethwick, from Gloucester Foundry, Limited, Gloucester. The furnace plant, which will have an output of half-a-ton of malleable castings per hour, is similar in design to a continuous unit already installed by Metalectric at the Dagenham works of the Ford Motor Company, Limited.

Hungarian Diary

By A. R. Parkes

Attending the 1st Congress of the Hungarian Foundrymen in Budapest

The heading illustration shows in the foreground Mr. J. Szasz, president of the Foundry Section; Mr. F. Martos, chief secretary, and Mr. M. Szele, president of the Hungarian Metallurgy and Mining Institute (OMBKE), at the opening of the Hungarian Foundry Congress on April 6.

A "Diary" is a good title for this report because it implies a day-to-day account in which the highlights of events are picked out; the time sequence is easy to follow and the opportunity is open for the inclusion of comment. A first Congress is always interesting and the chance is available to contrast the programme and its working out in practice with other conferences which are already familiar to readers.

The writer was privileged to attend the whole proceedings earlier this month in Budapest of the first Congress of the Foundry Section of the Hungarian Metallurgy and Mining Institute, of which organization he was a much-honoured guest. It was a multi-purpose trip: first, it was a goodwill gesture in relation to the recent admittance of the Hungarian Foundry Section to membership of the International Committee of Foundry Technical Associations; second, the Author was nominated by the Institute of British Foundrymen to present at the Congress a paper on the "Organization and Scope of the U.K. Foundry Industry;" third, it was hoped to record impressions of Central European foundry developments and the state of technological progress in the area; and of course, the opportunity was presented of meeting foundrymen from many countries, all having a fraternity of interests.

The extent of the "foreign" (meaning non-Hungarian) participation was between 20 and 30 out of 300 or so total registrations. Countries represented included, in addition to the UK (for which the writer was sole "flag-bearer"), West Germany (one representative), East Germany, USSR, Poland, Jugoslavia, Austria and Czechoslovakia. It is thought all these will agree with the comment that the Congress was organized with much forethought, had a high technological content, and was energetically carried through side by side with generous hospitality which it would be difficult to match anywhere.

Preliminary Gatherings

Saturday, April 4

The writer travelled out to Budapest by air on April 4 leaving London Airport at about 10 a.m. and arriving in Hungary at 5 p.m., with a change of plane at Brussels and a touch-down at Prague. (The return journey was made first to Vienna and thence direct to London and of the two this journey proved more comfortable.) At Budapest airport, a deputation from the Hungarian foundrymen was there to give a welcome—a very much appreciated gesture. It consisted of Mr. M. J. Szasz, head of the Foundry Section of OMBKE; Mr. M. Solti (the hard-worked secretary of the Congress); Mr. A. Choepo, head of the "malleable iron" section of the Hungarian Foundry Research Institute, and Miss E. Pattantyus, librarian at the Research Institute, who was subsequently attached as the writer's personal interpreter for the whole of the period in Hungary.

The party then travelled to the Duna (Danube) Hotel in the Pest part of the city (Budapest, as most readers will know, is a composite city of Buda and Pest divided by the river Danube). At the hotel, excellent quarters had been allotted the delegates (at the expense of the appropriate Government Ministry). The reception party was augmented there by Mr. L. Kalman with whom the writer had had previous contact in London and Liège and his colleague Mr. Cseh. Mr. Kalman, who is attached to the large Czepel iron and steel works, etc., near Budapest, acts as the Hungarian foundry organizations' foreign-relations executive.

Congress documents were then handed over. These included programmes, tickets, luncheon vouchers, etc., and a copy of the Hungarian Foundry Journal, containing preprints of 12 of the papers to be given at the Congress. In addition, translations in English of about half-a-dozen of the papers—with illustrations in some cases—were included. There was a useful plan view of Budapest, a lapel pin carrying crossed metallurgical and mining hammers (the badge of OMBKE), a handsome plastic-backed notebook and a cast-bronze medal-

lion about 4- by 3-in. bearing suitable lettering to serve as a memento of the Congress. Not least appreciated—as banks were closed until Monday—was a gift of over 1,000 forints to set against personal expenses while in Hungary. For visitors to Hungary about 64 forints are exchanged for the pound sterling; the hundredth subdivision of the forint being a "filler". (It will be recalled that the forint was brought into Hungarian currency to replace the "bango," after the disastrous post-war inflation.)

Sunday, April 5

After a morning of sightseeing, the opportunity was provided on Sunday evening of meeting the other foreign delegates and further members of the Hungarian Foundrymen's Section of OMBKE at a cocktail reception held in the Duna Hotel. Here, Mr. Szasz as president of the Section welcomed the visitors, speaking also for Mr. M. Szele, president of the parent body—the Hungarian Metallurgy and Mining Institute—who was unable that day to be present. Amongst those also introduced was Mr. F. Martos, chief secretary of OMBKE; Mr. G. Zoltan, secretary of the foundry section; Mr. F. Varga, Editor of *Ontode*, and most of the other Hungarian foundrymen previously referred to were also present. This informal "get-together" was much appreciated by the visitors as a means of making them feel at home with the hosts and each other.

Opening Sessions

Monday, April 6

The opening sessions and all the technical meetings of the Congress were held in the centre of Budapest at the *Technika Hazaban* (literally, Hall of Techniques) in Liberty Square. This is an imposing and grandiose building at present undergoing considerable renovation (as are many public and private buildings in Budapest following very heavy damage during the war when the city was a hotly contested battleground between Russian and German armies). The Hall of Techniques houses the permanent secretariat of about 15-20 other technical associations for different industries, in addition to OMBKE, and each of these has call on some of the building's committee rooms, several conference halls, etc., as needed from time to time for domestic conferences.

The inaugural meeting of the Congress was held in the imposing Grand Hall of the building, though unfortunately the acoustics were not too favourable. The opening ceremony was presided over by Mr. Szele, who officially welcomed first the overseas delegates and then his own members, the total gathering approaching 300. He also read apologies for absence and good wishes for the success of the Congress received from other foreign foundry associations. After announcing the recent election of the Hungarian Foundry Section to membership of the International Committee, he then gave—mainly for the benefit of the visitors—a short historical review of the country's foundry industry. It began in the 14th century, traditionally with copper-base founding and bellfounding in particular. Fundamental data of the Hungarian foundry industry were next quoted and some of the oldest establishments mentioned by name. Finally, Mr. Szele referred to post-1945 rehabilitation, the basic part played in the industry by the moulder and the inter-relation of the techniques of foundrywork—moulding, pouring, fettling, heat-treatment, etc. At the close of his speech, he formally declared the Congress open (repeating afterwards the gist of his remarks in German, which throughout was the second language of the Congress).

Lectures

The Congress lectures* were then given over the next two days. Only the first two of the twenty or more presented were read in the main hall; for the most part—on the UK Conference model—smaller halls were used and sometimes two and even three simultaneous sessions were organized, each, of course, with facilities for projection of slides, etc. In none of the sessions that the writer attended was the discussion on papers particularly brisk, though in some, quite lengthy information amplifying an author's remarks was given. Luncheon between sessions (at which the foreign delegates were guests of the Institute) was taken nearby, where a reasonably good service—considering the numbers—was provided in restaurants contained in the buildings of the "Partizan Club."

The first contribution in the series of lectures was made by Mr. L. Banhegye, who gave an account of the establishment and subsequent progress of the oldest Hungarian foundry—that established 115 years previously by Swiss-born Abraham Ganz and now part of the Ganz wagon works at Gjor about 72 miles up river from Budapest, on the borders of what is now Czechoslovakia. The second contribution—read to the Congress in abstract form in Hungarian by Mr. Choepo—was that of the present writer. Its title, "Organization and Scope of the UK Foundry Industry," had been approved by the Council of the Institute of British Foundrymen (who had received the original invitation for a delegate to offer a paper to the Congress) with the idea that it would be a communication which, by making clear the ramifications of trade, technical and research associations, etc., comprising the UK foundry set-up, would pave the way for future improved relations between British and Hungarian founders. At the session when the paper was presented (though even the abridged version as translated proved somewhat overlong) the objective appeared—from the obvious interest and subsequent comment received—to have been fairly well achieved and an increase in future technical interchange (foundrywise) can be expected between UK and Hungarian foundrymen.

* See programme of papers, printed in the JOURNAL, April 2, page 376.

Somewhat unfortunately, as the main hall where that meeting was held could not be darkened, presentation of the Author's slides had to be relegated to an afternoon session in one of the smaller halls. On that occasion, there was much interest exhibited in the examples illustrating outstanding castings made recently in the UK in various metals. It was clear that this type of material has perennial interest for foundrymen's gatherings, as naturally manufacturing details accompany the pictures shown.

SYNOPSES OF PAPERS PRESENTED

During the remainder of the two days devoted to technical sessions about 20 further papers were presented. Synopses of most of these are recorded below. If, on detailed consideration of the papers, some are found which are worthy of more extensive treatment, then lengthy abstracts or, in some cases complete papers, will be published.

Historic Development of the GAMZ Group Foundry

By L. Bainhegyi (Budapest)

This account dealt with the establishment 115 years ago of the oldest foundry in Hungary. It took its name from its founder, Abraham Gamz, and is now part of the large wagon and engineering works of the same name located in the industrial area close to Budapest. Abraham Gamz was born in Switzerland and had considerable experience in industry before, at the age of 30 years, he came to Hungary from Vienna, with other industrial experts, to establish metalworking in Hungary. At first, his foundry was attached to a flour-milling concern but very shortly afterwards, in 1844, it was separated as an independent unit. The output over the period has always been in the direction of producing quality castings and the firm has always had the reputation of being among the first to try out new techniques—particularly in regard to producing chilled castings.

Originally a crucible furnace was employed for melting and there were but seven employees. Shortages of alloys and other raw materials slowed down growth in the early years, but it was not long before there were considerable developments and a cupola was added to the plant and 30 more men taken on. In 1848, the foundry was making guns for the Hungarian National Army. After a further period of difficult trading conditions, the firm turned to making chill-cast rolls and wheels for rail cars, first with little success. However, success did eventually crown these efforts, and in 1855 these castings were shown at the Paris Exhibition. Towards the later period of his life, Abraham Gamz was helped at the foundry by German engineers.

Later Developments

In 1870, there were further economic difficulties in Hungary, but by then the foundry was relying more and more on export business. It formed the first railway-car factory to be built in Hungary and an electrical shop was added in 1879. During this time, the foundry output still included chilled wheels and rolls for mills, and later water-turbine castings were produced along with pipes of various types for carrying water, gas, etc. In 1896, an American engineer's Patents were purchased for a new production process, and the firm's technicians were sent to Buffalo, New Jersey, to study the methods used there. These later returned, with some American engineers, to rebuild the production shops in Hungary. The firm was amongst the earliest to use titanium-alloy iron for railway wheels. In more recent years, sections of the works were separated off for different types of manufacturing, but present-day production from the foundry still includes chill-cast rolls and pressure rolls for the cement industry. Nowadays the production of spheroidal-graphite iron rolls has been added.

Group of members and delegates attending the opening meeting of the First Congress of the Hungarian Foundrymen in the "Hall of Techniques," Budapest, on April 6.

Production of Cast Permanent Magnets

By Gy. Banky (Budapest)

Characteristic properties of magnetic hard and soft alloys; martensitic Alni and Alnico alloys; preparing the melt charges and instructions for melting; range of application of the shell-moulding process in production and dimensiona! accuracy obtaining; assembling and casting moulds for isotrope and anisotrope magnets; most-favourable casting temperatures; fettling and heat-treatment of the magnets; scrap castings and investigation of their defects; shrunk Alni- and Alnico-magnets, and barium ferrite, were discussed in this paper.

Hungarian Diary

Experiments with Spheroidal-graphite Iron Crankshafts

By M. Cseh (Budapest)

Amongst the requirements for crankshafts, tensile-strength and elongation are not of supreme importance. The question of material fatigue is raised first. Comparison is made of the properties of various forgings with those of s-g. iron. The very high wear-resistance offers a further advantage by making surface hardening, which is often applied, unnecessary. Cast crankshafts come much nearer to their final shape than do forgings for crankshafts, thus saving a considerable amount of material and machining. A summary of experience gained in the production and use of various compressors, lorries, diesel engines and crankshafts is given.

Tensile, Hardness and Structure at Various Cross-sections in High-strength Cast Iron

By M. Csiszar (Budapest)

An explanation of the various structures obtained dependent on wall thickness, chemical composition and pouring temperature. The zones of pearlite are shown in a diagram, and the relationship between tensile-strength and hardness of the various castings is discussed, taking the cross-section changes into consideration.

Pin-hole Porosity of Cast Steel

By J. Czikel

(Frieberg, Sachsen, East Germany)

The investigation led to the conclusion that pin-hole porosity of cast steel is identical with inter-dendritic shrinkage caused by hot-spots forming near the surface. This can be prevented by using a clean charge and suitable runner-system, and by proper feeding of the casting.

Exothermic Feeders for Heavy and Light Castings

By Gy. Emod (Budapest)

Critical survey of customary methods of reducing the sizes of feeding heads. The heating of risers, by exothermic feeding-compounds, as the best method for reducing losses of feeder-head material is dealt with. Results of experiments with exothermic feeder-heads are given. Suitable raw materials for exothermic feeder-compounds, and their calculation are commented upon. A diagram is given based on practical experience of estimating the quantities of exothermic materials required.

Critical Consideration of Moulding-sand Characteristics

By F. Fischer (Statzendorf, Austria)

This paper deals with the development of foundry technique in connection with improved knowledge of moulding materials, their properties, and conventional and latest methods for testing them. Amongst the testing methods mentioned, the estimation of clay-content and grain-size distribution are discussed at length. The "Crowther" diagram is suggested for the determination of clay-content. As suitable means for describing grain-distribution the pile diagram, the accumulative curve, and the frequency curve are discussed. The author prefers the presentation by accumulative curve, and suggests a standardized scale of abscissae and ordinates. He also mentions the fineness number, but the use of this figure as a characteristic for grain-size distribution is too uncertain. Based on the author's own experiments, a relationship between degree of homogeneity, binder contents, permeability and strength values is established. Finally the problem of scabbing is discussed.

Design of Castings in Relation to Casting Techniques

By G. Gertz (Leipzig, East Germany)

A designer must always keep the conditions under which a casting is poured before his mind's eye. The author discusses materials, correct design of castings and their castability and machinability.

Manufacture of Alloy Cast Iron Without Imported Metals

By N. Hajto and F. Varga (Budapest)

Extensive laboratory experiments were carried out to study the influence, on cast iron, of alloys with up to 5 per cent. Mn and 4 per cent. Al, which constituents were added to cast iron having about 1 to 2 per cent. Si content. The resulting structures and properties were examined. Further experiments were made to investigate the influence of silicon, in which an increased silicon content was compensated by a reduction of the aluminium content. The melts were prepared in a Tamman furnace, a Junkers graphite-electrode melting-furnace, and a cupola. Finally, the influence of magnesium additions and of heat-treatment on the structure of cast-iron containing silicon and manganese, were studied.

Moulding with Indigenous Cement/Sand

By L. Kalman (Budapest)

Results of experiments carried out with various accelerators are given. The breaking stress of test-pieces made from $CaCl_2$, molasses, dextrine and mixtures of these, in conjunction with drying-time, water-content and cement-content is discussed. Practical technology of mould production is dealt with. Practical examples and illustrations of castings made in cement moulds are given. The problem of sand reclamation and economic importance of the cement/sand moulding process is commented upon.

Problems and Experiences in the Production of High-silicon and Iron Castings

By E. Lendvay (Budapest)

Characteristics and properties of acid-resisting alloys having 12 to 18 per cent. Si content and the possibilities of using these as casting materials; the technology of the production of good-quality Ferrosil-castings, and scrap castings, their causes and prevention, are dealt with. Correct ways of producing some instructive castings; experiments to examine the possibilities of production and to improve the casting quality and reduction of gas-content, and application of gas-scavenging are also covered. Comparison is made of various furnace-types recommended for this line of production, and use of grain refiners is commented upon.

Running and Gating of Castings

By K. Marechal (Budapest)

The causes and occurrence of scrap are dealt with and gating systems for the production of light-metal sand-castings, die-castings and sand-cast copper-base alloys are discussed. Feeding, shaping of the ingate in order to obtain sound cross-sections, and surface finish are commented upon.

Cooling Stresses in Steel Castings

By Zo Nagy (Diosgyor, Hungary)

Thermal conditions influencing the cooling of steel castings and the development and importance of cooling stresses and their elimination are discussed. These stresses can be caused by the design of the casting, by the production method, or by the quality of materials used. Possible consequences of such stresses can be cold shortness, warping and residual permanent stresses caused by elastic deformation. Methods of avoiding or eliminating such stresses can be of a design or technological nature.

Oxidation of Cast Iron

By Gy. Nandory (Budapest)

Description of the equipment used for determination of the gas-content in cast-iron. The gas and oxygen content of cast-iron may be varied by bubbling air through the melt, or by using a slag of high FeO-content. The relationship between the total gas- and oxygen-content of cast-iron and the C, Si and Mn content is dealt with. The development of silicate inclusions during the oxidation of liquid cast-iron, and identification of these silicates by microscopic examination, is discussed.

Mr. L. Bainhegyi presenting his paper on the Gamz foundry, at the first session.

Organization of the UK Foundry Industry

By A. R. Parkes (Assistant Editor, Foundry Trade Journal)

The purpose of this paper is to give foundrymen abroad a survey of the organization of the UK foundry industry in the fields of research, technology and production. Several technical associations for foundrymen exist in Great Britain, the iron founders alone having about 20 different associations. Non-ferrous founders, patternmakers, etc., have separate groupings and the paper deals with the foundation and mutual connection of these organizations, while the illustrations deal with recent successes of British foundrymen; finally, data on capacity and production statistics of the foundry industry are given.

Shop Experience in Czechoslovakia with Chemically-hardened Moulds and Cores

By L. Petrzela (Brno, Czechoslovakia)

In this paper, which is coupled with a film show, the author describes the shop experience gained with chemically-bonded moulds and cores. He discusses the various types of sodium silicates and moulding sands used in the CO_2 process, and also the surface treatment of the moulds and future possibilities of application of this method.

Shell Moulding in the Czepel Iron and Steel Foundry

By O. Raca (Budapest)

The author deals with preparations for the production of shell moulds; practical experience in the

Hungarian Diary

production of ribbed cylinders for motor-cycle; patternmaking; gating; experience with silicones as parting compounds for shell moulds; removal of residual silicone oil and other impurities from patterns, and the influence of the quality of the phenolic resin on the formation of air pockets between the ribs of shell moulds for motor-cycle parts. Methods of removing these air pockets are discussed and a survey of the production of shell moulds and core boxes, is given. Other aspects commented upon are: shell core-blowers; doubling of the production of green-sand castings, provided that they have one flat side, by using separate shell cores; methods of testing shell strength; the strength of moulding sands mixed with resin powder and of resin-coated sands; influence of ramming on the strength of shell cores; the requirements for moulding sands for the production of shell cores of various types and stresses, and further development of shell moulding in the Czepel Iron and Steel foundry based on existing experience.

Non-scaling Casting Alloys

By R. Radtke (Leipzig, East Germany)

Causes of scale resistance and the way they are influenced by working conditions are discussed. The influence of the carbon content; the effect of chromium silicon and aluminium and their interchangeability, mechanical properties and machinability; melting and practical examples of casting defects, are also reviewed.

High-strength Aluminium-alloys for Sand and Die-casting

By B. Rosner (Budapest)

Aluminium alloys for sand- and die-casting, and the influence of alloying elements and impurities are discussed. The production of these alloys, their mechanical properties and melting processes, and the influence of the melting temperature on the mechanical properties and on the structure are dealt with. Fettling methods and heat-treatment are also reviewed.

Heat-treatment of Low-copper Brasses

By K. Rutkowsky (Crakow, Poland)

As the result of many years of research, a brass alloy containing copper, zinc and manganese has been developed, the copper content of which does not exceed 50 per cent. This alloy is now being used in Poland for the casting of machine parts, fittings and similar components. The structure of these alloys, their mechanical properties in relation to composition changes and the influence of heat-treatment on the mechanical properties of Cu-Zn-Mn alloys, have been investigated for a range of compositions with a ratio Cu/Zn of 0.8 to 1.25, and a manganese content of up to 10 per cent. The development of these new alloys led to a considerable reduction in copper consumption in Polish industry.

Epoxy Resins ("Plaste") for Patternmaking and Moulding

By J. Schiegner (Groeditz, East Germany)

The author deals with the importance of epoxy resins and their properties; their application in patternmaking, and the technology of pattern production, especially of machine-mould patternplates.

Czechoslovakian Experience with Preheated Cupola-blast

By B. Sochor (Prague)

A review is made of the present hot-blast cupola, particularly as regards Belgian and East-German praxis. A description of an experimental, and three other different hot-blast production-cupolas, is given. Finally, the results of Czechoslovakian experiments are published, and methods are detailed which have led to considerable progress in efficient melting of cast-iron in hot-blast cupolas.

The Polish Foundry Industry 1957/58

By F. Strek and J. Piszak (Crakow, Poland)

The Polish foundry industry regained in 1948 the level of production of 1937 by modernizing old foundries and by building many new plants. Production of steel castings is higher than in some better-developed countries. Only malleable cast-iron has lagged behind, the requirements of the machining industry in this field are not yet high enough, but development is proceeding. There are nearly 320 iron foundries in Poland. Cast-steel is produced in 30 foundries and there are about 320 non-ferrous foundries. Amongst special foundry processes used the shell-moulding process occupies a leading place.

Properties, Testing and Suggestions of Standards for Die-cast Grey Iron

By I. Sturm (Frieberg, East Germany)

The author deals with the properties of die-cast grey-iron castings, and with remedies for the disadvantages which result from too-sudden cooling of such castings. He further discusses the special conditions of die-casting, the mechanical properties of iron castings, and their chemical composition. Finally, suggestions are made for a standard for die-cast grey-iron castings.

Strength of Shell Moulds at Casting Temperature

By J. Szekeres (Budapest)

The author discusses the dimensional limits of castings made by shell-moulding; the strength of

shell moulds at the pouring temperature of various metals; the extent of metallostatic pressure when casting steel and bronze, and the disadvantages developing from attempts to obtain a better shell strength by increasing the resin content of the moulding sand, or by increasing the shell thickness. He also deals with the quantity and pressure of gases developed by burning resins, and gives results of experiments to incorporate additives into the moulding sand, in order to increase its strength at elevated temperatures.

Preparation of Moulding Materials for the Green-sand Foundry

By A. Toth (Budapest)

The author deals with the mechanization of moulding operations, and comments on: requirements for the moulds; green-sand moulds of high and low strength; the constituents of low-strength moulds; the technology of mixing moulding materials; the avoidance of various moulding-sand defects by proper mixing and correct mixtures; high-strength green-sand moulds, their testing and use, and prospects of development of green-sand moulding.

NZ Relaxes Import Control

Additional import licences are to be granted by the New Zealand Government this year for raw materials and equipment needed by manufacturers, and some consumer goods. Other commodities, including a number of raw materials, will be imported on a greater scale after consideration of individual applications.

Among items of which greater imports can now be made are:—Hardware, spare parts for motor vehicles, corrugated sheet iron, copper, brass, and aluminium pipes, lenses, clocks, electric razors, reading lamps, batteries or cells, perambulators, and building materials.

The Government will, it is estimated, require an additional £15,000,000 to £20,000,000 to cover the increased imports, but the 1959 total, given as £210,000,000, will still be £30,000,000 less than the total for 1958.

Warrington Foundry to Close

One of its smaller subsidiaries, Ferrous Castings, Limited, Warrington (Lancs), is to be closed in July by Metal Industries, Limited. Ferrous Castings, which was founded in 1919, manufactures iron castings for the engineering and electrical trades.

Announcing the closure, Metal Industries states that £14,000 is being set aside for final payments to the company's 125 employees over and above their normal salaries or wages. Adverse trading conditions, coupled with a continued decline in the use of grey-iron castings by companies within the group, have involved Ferrous Castings in substantial losses over a period.

BSI NEWS for April lists among "Revised British Standards" No. 1125:1959, w.c. flushing cistern (including flush pipes). It costs 4s. 6d. and is available from the sales branch of the Institute, 2, Park Street, London, W.1.

Glover & Main and Meters Merger

Offer for all the issued share capital of Meters, Limited, Manchester, has been made by Glover & Main, Limited, the financial company controlling gas engineers, makers of gas appliances, etc., of London, S.W.1. The offer for the 350,000 £1 ordinary shares is 21s. 3d. cash per unit and for holders of the 150,000 £1 5½ per cent. preference the terms are a share-for-share exchange into Glover & Main 6 per cent. preference.

The directors of Meters propose to pay a second ordinary interim of 3½ per cent., making 6 per cent. for the year to March 31, 1959, as for 1957-58. Glover & Main recently announced an effective increase in its ordinary dividend total from 10 per cent. to 13¼ per cent. Although Meters profits for 1958-59 are likely to show an improvement on the previous two years, the directors confirm that since dividends for those years were not fully covered by profits earned, no increased distribution would have to be made for the current year had the present offer not been made. They have accepted the offer in respect of their personal holdings and recommend it to other holders. If it becomes unconditional the chairman, Mr. V. A. B. Hughes, will resign, and it is proposed to pay him £2,500 as loss of office compensation.

A one-for-two free scrip issue to holders of the £1,202,814 ordinary shares is proposed by Glover & Main. In connection with its offer to Meters, the directors also propose to make a scrip issue of new 6 per cent. preference, on a one-for-five basis, to holders of the £50,000 6½ per cent. preference in compensation for the reduction of the dividend rate to 6 per cent.

Borough Polytechnic Exhibition

Borough Polytechnic, Borough Road, London, S.E.1, announce that following a successful series of lectures on "Foundry Sands" an exhibition—spread over three laboratories—is to be held on the evening of May 5 from 6.30 to 8.30 p.m. There are to be exhibits from F. W. Beck, Limited, London; W. J. Hooker, Limited, London; Foundry Services, Limited, Birmingham; Foundry Suppliers, Limited, London; Ridsdale & Company, Limited, Middlesbrough, and Stone-Coleman, Limited, London. Readers are cordially invited by the principal, Dr. J. E. Garside, and the staff of the foundry department to visit what promises to be a unique occasion.

Liège Fair

The Eleventh Liège International Fair will be opened on Saturday, April 25, by Belgium's Prime Minister, Mr. Van Houtte. The Fair will last until May 10, and the British contingent will consist of 27 firms, some of which are listed: Acraspray; John Allen & Sons, Limited; Colchester Lathes, Limited; Coventry Climax Engineering, Limited; B. Elliott & Company, Limited; Hoover, Limited; Johnson, Matthey & Company, Limited; Lansing Bagnall, Limited; Marston Excelsior, Limited; Massey-Ferguson, Limited; Suffolk Iron Foundry (1920), Limited; Willson Lathes Company, and Wolf Electric Tools, Limited.

Mr. LINDSAY S. CARSTAIRS has been appointed a director of the Barrow Haematite Steel Company, Limited.

Equipment & Supplies

Moisture-content Meter

Shaw Moisture Meters, 37, Market Street, Bradford, are now marketing the Shaw moisture alarm, which will light a lamp, ring a bell, or alter controls when the moisture content of a sample of sand goes beyond the required limits. The amount of moisture is indicated by a dial reading, and two adjustable pointers coloured red and green may be initially set to the desired control points by two external screws on the dial (see Fig. 1). An external electrode is used, which makes the measurement by dielectric means at a frequency of 100 megacycles.

Sample Measurement Only

The instrument is not suitable for continuous measurements, but is intended for the measurement of samples. Only two or three gms. of material is required, which need not be weighed, an accuracy of ± 0.1 per cent. being achieved. A full-scale deflection on the 5 in. dial may be obtained for a range of only two per cent. moisture-content. The probes of the instrument are on the end of a 3 ft. lead, which can, however, be lengthened if necessary. A working model of the instrument will be exhibited at the forthcoming Factory Equipment Exhibition at Earls Court in April.

Metal Pre-treatment Plant

Electro-Chemical Engineering Company, Limited, Sheerwater, Woking, Surrey, have introduced the AGI-DIP fully-automatic multi-stage pre-treatment plant. It is flexible in design and can be used for various types of cleaning and process treatments, including pickling and phosphating, on a wide variety of ferrous and non-ferrous metal components. The parts to be treated are loaded into baskets, which are then automatically passed through agitated immersion stages, the number of these depending on the treatment required. Trichlorethylene-vapour degreasing, spray-rinsing, and drying sections may be incorporated into the sequence if required. Agitation is carried out by means of a reciprocating pneumatic arrangement that is adjustable for amplitude and frequency of stroke. Double-acting air cylinders enable the work platforms to be driven down into the solutions at a faster rate than the freely-falling components, thus effecting complete separation of tightly-packed parts. The work is transported through the sequence by means of an index beam conveyor controlled by a timing mechanism. This mechanism can also operate automatic loading and unloading platforms to link the plant with a shop conveyor. Only one operator is normally required for the plant.

Compressed-air Fire-extinguisher

Atlas Copco A.B., Stockholm, Sweden, are advertising a fire-fighting system which utilizes compressed air. Designed for use with liquid fuels, it is based on a simple principle. Air is forced into the bottom of the oil or petrol cistern which is alight, and the resultant air bubbles in the lower, and cooler, oil layers percolate upwards to the surface of the cistern. This produces two actions: (*a*) the compressed air dilutes the inflammable vapour and thus "chokes" the flames, and (*b*) the air lowers the oil temperature (and with it the volume of vaporization) so that there is insufficient gas to sustain a fire. The method is not new, having been employed for some years in fighting oil fires in the United States and, more recently, in Sweden. A big advantage of the system is the arrangement whereby the air nozzles are located on the bottom of the cistern, and thus are not affected by explosions which often damage the roof of the cistern, rendering ineffective foam-extinguisher units fixed to the roof.

METAL PORCELAINS, LIMITED, Cornwall Road, Smethwick, are now marketing sheet-iron enamels capable of very thin application. They are claimed to give good quality work with no more than two coatings, and to be remarkably heat-resistant.

FIG. 1.—*Moisture-content meter, introduced by Shaw Moisture Meters, of Bradford, which can be preset to required limits by external screws.*

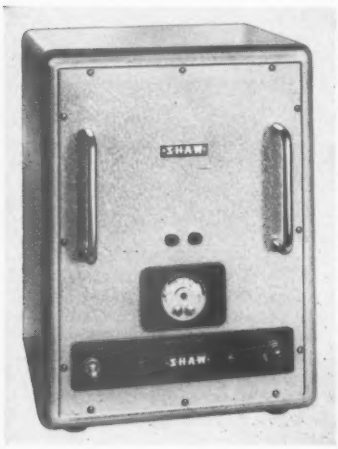
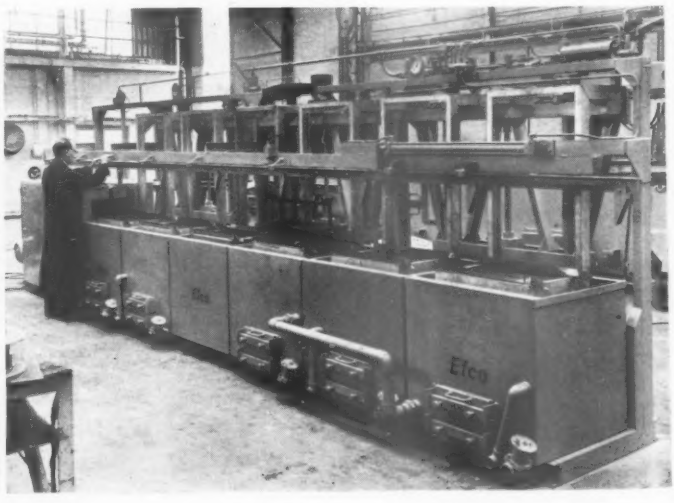


FIG. 2.—*Pre-treatment plant introduced by Electro-Chemical Engineering Company, Limited, of Woking.*



Brinell Hardness Testing Machine

Specially designed for testing large components, a Brinell hardness testing machine has recently been completed by Edward G. Herbert, Limited, Atlas Works, Levenshulme, Manchester, 19.

The hand-operated type Brinell head, similar to those incorporated in the standard machines, comprising an 8-in. dia. 0-3,000 kg. pressure-gauge, checkweights, hand-operated pump and 10-mm. dia. ball support assembly, has been fitted into a substantial crosshead which is supported on two screws located in the heavy cast-iron base, adjustable to any vertical position. With a table 44 by 24 in., this particular machine has a 30-in. clearance between the screws and is adjustable up to a maximum height of 24 in. between the base and the 10-mm. dia. steel ball. These sizes can be varied to suit individual requirements. The machine (Fig. 2) is only one of a large range which the company builds under licence from the Tinius Olsen Testing Machine Company, Philadelphia, USA.

Dumper

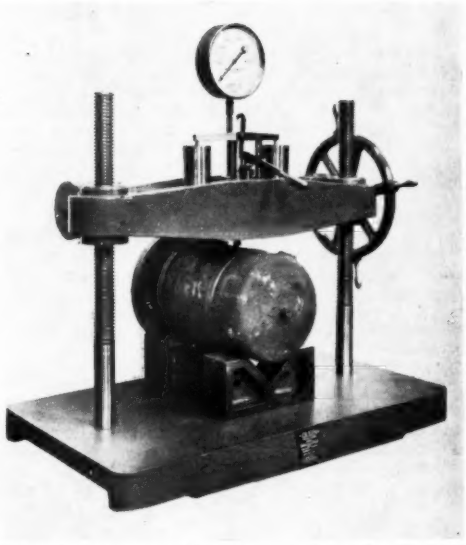
A more powerful version of the Muir-Hill 10B 3-cub. yd. dumper is announced by E. Boydell & Company, Limited, of Old Trafford, Manchester. A characteristic of the new machine is the high degree of driver comfort provided. Other features are: hydraulic brakes; hydraulically-operated clutch; finger-light steering; weatherproof cab, and hand controls located for easy gear-changing and body-tipping. The dumper is powered by a Fordson "Power Major" 3.61-litre capacity 4-cylinder diesel engine, which develops 52 b.h.p. at 1,600 r.p.m. A constant-mesh gearbox provides six forward speeds and two reverse speeds. Hydraulic transmission, incorporating torque converter and epicyclic gearbox, is an optional extra. The machine's greater power is balanced by more robust construction of the chassis, axles, steering and tipping gear.

Rust-inhibitor

C. & P. Development Company (London), Limited, Wiggie Works, Redhill, Surrey, announce that they have developed a metal coating, known as Rust-Anode, that leaves a protective film of pure zinc when applied to steel surfaces. It incorporates an extra binder which ensures a hard surface, making the paint useful for such things as anchor chains, gas cylinders and anything else subject to abrasion and friction. It can be applied by brushing, spraying or dipping, and the resulting protective coat is claimed to be strongly adherent, ageproof and rustproof. A brush application of Rust-Anode deposits a 95-per-cent.-pure zinc coat, of 0.002 in. thickness, which experiments have shown to be equivalent in rust-inhibitive properties to a heavily-galvanized surface.

Easily-cast Steel-like Material

General Motors Corporation, of America, have developed a new steel-like material which may offer engineers a replacement for plain-steel forgings, and permit design flexibility of castings. Known as CentraSteel, the material consists of iron plus the following elements: 1.70 per cent. carbon, 2.25 per cent. silicon, 0.40 per cent. boron, and some tellurium. The metal has an elastic modulus approaching that of steel, and can be more easily cast and machined. It is claimed that it does not require extensive heat-treatment, costly addition agents, injection apparatus or low maximum sulphur content. Its high elastic modulus suggests applications to parts for which most cast materials at present available would be unacceptable.



Brinell-hardness machine for testing large components, now being marketed by Edward G. Herbert, Limited, of Manchester.

Welding Rods

Two additions to their range of Sifbronze welding rods are announced by Suffolk Iron Foundry (1920), Limited, Stowmarket, Suffolk. Process "101" is a new method of joining cast iron by process welding, which it is claimed produces joints infinitely superior to anything hitherto obtained. The old sluggishness of flow across the joint face has been completely eliminated and a far greater degree of "penetration" into the parent metal, it is said, which makes "peeling" a thing of the past, and results in a weld even stronger than the original cast iron! Process "104" is a rod of the same alloy as Sifbronze rod "101," but coated with a new type of flux coating which is intended to have a strong scavenging action on cast and malleable iron.

Heat-exchanger Protection

A simple means of preventing corrosion in auxiliary heat-exchangers and small condensers, etc., is now being manufactured in this country by F. A. Hughes & Company, Limited, 4, Stanhope Gate, London, W.1. This is the Galvion anode, of which there are three sizes, comprising a brass plug with B.S.P. tapered threads, and a number of high-purity zinc "bobbins" or elements having a threaded centre steel core. The elements can thus be screwed into each other to allow adjustment of length to fit confined spaces without waste. An interference thread ensures vibration-proof service. It is only necessary to drill and tap the cover of the spaces to be protected, the tapered plug thread ensuring a watertight joint without the need for sealing compounds. Existing drain plugs can often be used. Thus simple fitting and even easier renewals help to ensure that the protection is maintained and full benefit is received.

British Exhibition in USA

The first comprehensive all-British exhibition ever to be staged in the United States of America will take place in the Coliseum Building, New York City, June 10 to 26, 1960. The exhibition which is being organized by the Federation of British Industries through its subsidiary British Overseas Fairs, Limited, has the full backing and active support of Her Majesty's Government, the Dollar Exports Council and the British-American Chamber of Commerce in New York. Many of the ideas embodied in the British pavilions at the Brussels World Exhibition last year will be applied in New York but a fresh approach will be made to American buyers and the general public. The primary purpose of the exhibition will be to demonstrate the best and most advanced achievements in British science, technology, and engineering, but the British "way of life" will also be illustrated.

The British Government's exhibit on the ground floor will provide the introduction to this theme of Britain at work and play; also on the ground floor will be the Rotunda where a series of collective exhibits will show the products of some of Britain's major export industries including iron, steel, shipbuilding and motor transport. Top-quality consumer goods will be shown by world famous firms in a special section, on the second floor, to be known as the "Bond Street Area."

Another floor will be devoted to engineering products, exports of which to the USA have recently been increasing rapidly. A special feature showing examples of precision engineering will stress the superb quality of British engineering. Individual exhibits will include both light- and heavy-engineering products, electrical, mechanical and chemical engineering goods, machinery and equipment for all industrial purposes, plastics, chemicals, drugs and pharmaceuticals, office equipment, agricultural machinery, radio and television sets, and sections for electronics, automation and instrumentation. A special section will be devoted to goods manufactured in North America under licence to British patents, licences and formulae.

With the exception of the British patented goods made under licence in North America, it is a condition of the exhibition that all products on display must have been manufactured or produced within the United Kingdom. The New York Coliseum is recognized as a bonded area, and exhibits can be displayed there without payment of duty, provided they are re-exported from the United States at the close of the exhibition. Exhibits sold during the period of the exhibition for delivery after its close will, of course, carry the normal rates of duty. A brochure covering the exhibition is available from British Overseas Fairs Limited, 21, Tothill Street, London, S.W.1.

"SOME FOUNDRY CONCERNS tend to take work at prices which often seem unrealistic when compared with the current price levels of raw materials and wages," says Mr. H. M. Jones, chairman of Follsain-Wycliffe Foundries, Limited, Lutterworth, Leics., in the firm's annual report. He continues by saying, "In no way does this increase the amount of work offered to iron foundries, it merely depresses the market and results at least in low profit margins, if not in entirely uneconomic trading. This is a regrettably unhealthy factor which will not only endanger the survival of foundries themselves but will eventually have far wider repercussions."

£54,000,000 Programme for Technical Education

A new capital investment programme planned to cost £54,000,000 for technical education in the three years after 1961 was announced last week by Mr. Geoffrey Lloyd, Minister of Education. Mr. Lloyd, who was Minister of Fuel and Power from 1951 to 1955, took up his present duties in September, 1957.

He said in his announcement that in order to maintain the momentum of the advance in technical education, a building programme of £15,000,000 would be approved for 1961-62 and that programmes for 1962-63 and 1963-64 would be provisionally set at the same figure. This total programme of £45,000,000 was expected to involve consequential expenditure of £9,000,000 on equipment. The £70,000,000 building programme for the five-year period covered by the 1956 White Paper up to 1961 was progressing steadily. Mr. Lloyd said that building projects under this plan for new colleges or major extensions now numbered 359, and in 1958 the amount of work started amounted to £15,000,000. Local education authorities would now be able to continue to plan their building work two years in advance.

The new three-year programme would provide for further increases in the output of advanced students in science and technology beyond the level of 15,000 a year which the plans announced in the White Paper were designed to make possible, further expansion in educational provision for technicians and craftsmen to match the training opportunities which it was industry's task to provide for the growing number of young people who would be available for employment, and improving existing facilities in the colleges not only for teaching but also for social and recreational purposes, including hostels.

Mr. Lloyd also made the announcement that he has decided to double the value of the Whitworth Fellowship, the premier award in engineering, from £500 to £1,000 a year from 1960. He has decided to alter the rules so that the award in future will be given not to newly qualified graduates but to practising engineers who have shown themselves to be extremely able and likely to benefit from additional study and training. The Minister said that he was taking these steps to meet conditions which have arisen since the scheme was introduced and to maintain the long-established prestige of the award.

Change of name for MERL

The Council for Scientific and Industrial Research announces that in future the Mechanical Engineering Research Laboratory at East Kilbride, near Glasgow, will be known as the National Engineering Laboratory. This is because the Council considers it desirable to emphasize the national character of the laboratory which is part of the DSIR organization and is financed from public funds. It does not imply any change in the field covered by the Laboratory, which will continue to be concerned with problems of mechanical engineering.

The Council has also decided to set up a steering committee to look after the programme of the Laboratory, as it is convinced that, between the activities of the universities and technical colleges on the one hand and research associations and private and nationalized industry on the other, there is an important place for a national establishment for research in mechanical engineering, mainly supported by public funds.

*Craft Apprentices' Corner**

Hungry Metals . . .

. . . with "Tubal Cain" on the Job!

"All right," you'll probably say, "having waded through this stuff about feeding heads† what now? You've told us something about feeders and what's likely to happen if we don't use 'em—what you haven't told us is *when* to use 'em. Let's be hearing!"

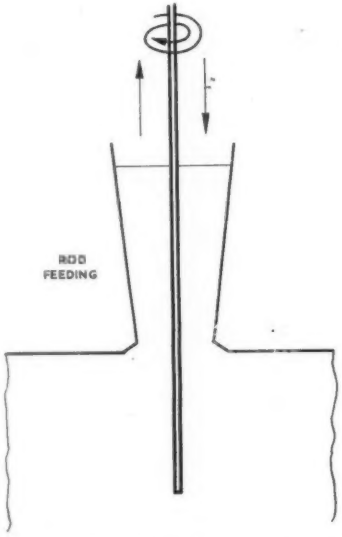


FIG. 1.—*When pouring the bigger grey-iron castings, a wrought-iron rod is thrust into the feeding head and agitated, with the object of helping the liquid feed metal to feed down into the casting by gravitation.*

"Hungry" metals must be well fed.

Well now fellers, the answer's simple enough, it just depends upon the metal or alloy from which the casting is made. Remember what I said about solidification shrinkage—"All of the metals and alloys used for casting purposes experience shrinkage in some degree . . ."? Well now, some metals and alloys experience a much higher volumetric shrinkage than others, and these are the ones you must watch out for. "Hungry" metals they are, and unless they are well fed they will, like a hungry moulder, finish up with a hole inside them. Let's go through the list of the metals and alloys in general use for casting purposes and see what transpires.

Rod-feeding is usual for big grey-iron castings . . .

Amongst the ferrous metals, grey iron can be expected to give the least trouble from shrinkage defects—under ordinary circumstances feeding heads as such are not often required, but with the more massive castings it is the usual custom to resort to rod-feeding in order to obtain soundness. When the mould has been filled with molten metal a pre-heated wrought-iron rod is immersed into the feeding head to a depth some distance below the connecting neck of the feeder. The rod is then moved up and down, and round and round see (Fig. 1), with the object of keeping the neck of the feeder "open" (fluid), so that the liquid feed-metal from the feeder head can feed down into the casting under its own gravitational force. The size of the feeding rod naturally depends upon the size of the feeder and the mass of the casting, and may be anything from ½ to 1 in. dia. By the same rules the length of time taken up by the process of rod-feeding will vary, from three or four minutes onwards, with the casting, and for heavy solid work (for instance, a 30-ton anvil block) will very often extend to six or eight hr., during which time the feeder will be frequently "topped-up" with hot metal from a small hand ladle.

. . . and high-duty irons need even more feeding.

High-duty irons have a higher shrinkage than grey irons and will, therefore, require more feeding, although a lot depends upon the grade and analysis of the iron under consideration. Top feeders or side feeders are used according to choice, and care must be taken with the feeder design so that it will break cleanly from the casting and not "break-in"—rod feeding is, of course, permissible with these irons.

* Popular jargon of the foundry has, as usual, been used in parts of this article. Apologies are made to translators.—Editor.

† See Craft Apprentices' Corner earlier this year, page 281, in the March 12 issue of the JOURNAL.

Craft Apprentices' Corner

Malleable-iron castings need slag-traps . . .

Malleable irons present many difficulties in the production of sound castings. They are sluggish in pouring and, therefore, require high pouring temperatures. Because it is essential that the castings be free from slag inclusions it is necessary to provide some form of efficient slag-trap in the gating system, and for this purpose either strainer cores (Fig. 2 (left)), or a spinner-type slag-trap (Fig. 2 (right)), are in common use. Malleable irons have a high shrinkage and quite large feeding heads must be provided on heavy sections. In almost all malleable castings the feeders are positioned on the joint *i.e.*, as side feeders, but occasionally top feeders are used. Gating through the feeder is adopted extensively, and it is common practice to provide a "breaker pad" on the casting at the juncture of the casting and feeder neck. Blackheart malleable provides an example of "padding" the casting in order to accommodate a larger feeder neck.

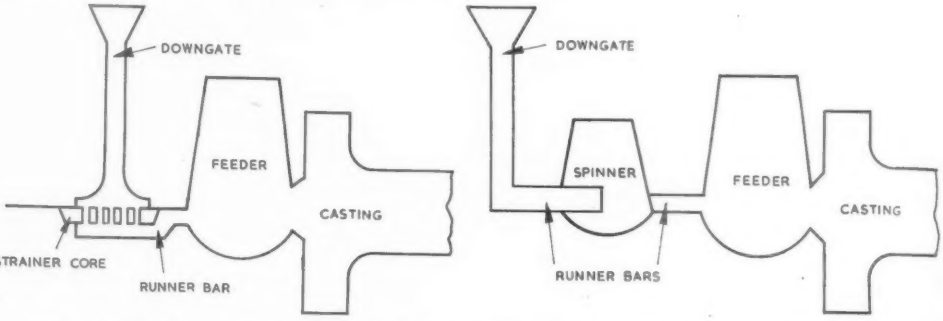


FIG. 2.—*Two methods of reducing slag inclusions in malleable-iron castings, (left) a strainer core, and (right) a spinner-type slag-trap.*

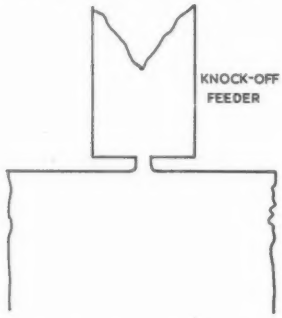


FIG. 3.—*On certain steel castings the "knock-off" type of feeder, having a short, small-diameter neck, is used.*

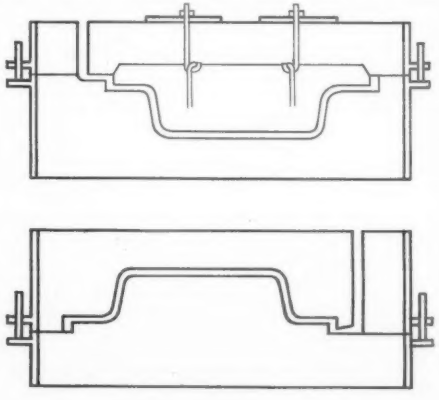
. . . and s.-g. iron requires large feeding heads, . . .

S.-g. irons have a high shrinkage and require large feeding-heads; however, because the feeders are cut off the castings and not broken off, the founder of s.-g. irons has a little more latitude in the shape and size of his feeders than his brother malleable-founder, and both top and side feeders are used extensively.

. . . while steel is *really* "hungry."

Steel requires very large feeding-heads (there's a *really* hungry metal), and unless you have had actual experience in a steel foundry it is often difficult to appreciate how much feeding really is required. Side feeders, top feeders, gating through the feeders, chills, densener nails, feeding fluxes and so on, all of these are employed at some time or other on different classes of work. Some very heavy castings are made in steel, and feeding heads of 36 in. dia. (and very often larger) are by no means unusual—remember too that a single casting will quite conceivably require six or eight of such

FIG. 4.—*Comparison between moulding technique for grey-iron (top), and aluminium alloys (bottom).*



feeding heads. Taking steel castings as a whole the yield is probably about 40 per cent.—that is, out of every 100 tons of metal melted only about 40 tons of castings are obtained, the remaining 60 tons being taken up by runners and feeders. These figures do not necessarily apply to *all* steel castings (for instance, with the heavier steel castings the figures are often reversed, *i.e.*, 60 per cent. castings

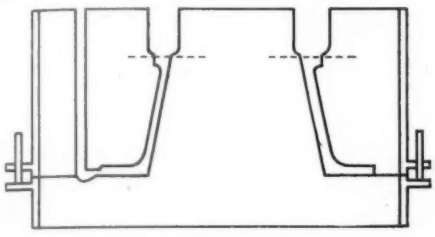


FIG. 5.—*With important light-alloy work, the upper surface of the casting is often extended through the cope and flared out to form the feeder head.*

and 40 per cent. runners and feeders), but they will serve as some indication of the size of the feeders in relation to the size of the casting. It is the usual custom in the steel foundry to remove the runners and feeders from the casting by cutting-off with an oxy-acetylene torch, hence here again the founder may employ really large feeders in order to "sound" his castings—at the same time he is always conscious of the ever-present problem of fettling costs, and on certain castings he will use a "knock-off" type of feeder. This is a specially designed feeding-head, quite bulky, which is connected to the casting by a very short and small-diameter neck (see Fig. 3). According to the size of the feeder, it may be joined to the casting by three or four of these very small connecting necks, but whatever the case may be the result is the same —the feeder is broken off the casting, thus showing a considerable saving in both time and cost. Alas, however, the knock-off feeder is not suitable for *all* steel castings.

Most non-ferrous alloys are bottom-gated . . .

Almost all the non-ferrous alloys are "hungry" metals, but under the heading of "non-ferrous" the alloys may be sub-divided into "light alloys" (aluminium alloys and magnesium alloys) and "copper-base alloys" (brasses, bronzes, and other alloys which have copper for their base). The foundry treatment of these non-ferrous alloys differs somewhat from that of the ferrous metals, and one of the golden rules for almost all of the non-ferrous alloys is *avoid turbulence during pouring;* in order to achieve this bottom-gating methods must be used. There are a few exceptions to this rule, and certain alloys may be top-gated quite successfully; but at the same time most other alloys definitely *must* be bottom-gated. Bottom-gating in the light alloys is achieved quite easily by reversing the usual moulding tactics. Whereas in the iron foundry the deep part of the mould is almost always the drag (see Fig. 4, top diagram), with light alloys the deep part of the mould is almost always the cope, hence if the gating system is situated on the joint of the mould (a very common procedure) then the casting is actually bottom-gated, as in the lower diagram in Fig. 4.

. . . because of their low specific gravity— . . .

This method is successful mainly because of the low specific gravity of the non-ferrous alloys; they exert little pressure against the mould face, nor does head pressure exert much influence upon the denseness of the structure of the metal. This question of low pressure is very important to the light-alloy founder—it means that he can obtain little benefit from extending the height of the feeders. Hence with light alloys the type of feeder favoured tends to be short and squat, *i.e.*, the cross-sectional area is enlarged at the expense of height. Side feeders or top feeders may be used according to choice, and as a general rule they extend right through the cope and are open to the atmosphere. Blind feeders are not often used with light alloys. In many cases where important work is involved

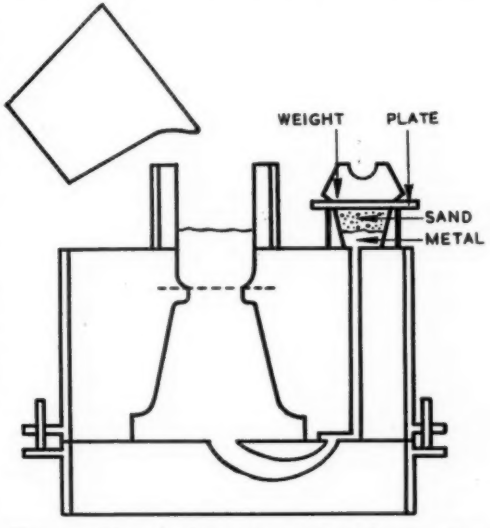


FIG. 6.—*The "back-pouring" principle, sometimes used when a manganese/bronze or aluminium-bronze job is made with a single top feeder.*

the whole of the upper surface of the casting is extended through the cope (see Fig. 5) and flared out to form the feeder head, thus ensuring that adequate feed metal is distributed more or less uniformly throughout the casting.

. . . copper-base alloys may be "back-poured."

In the range of copper-base alloys the tin-bronzes, gunmetals, and phosphor-bronzes are the ones least

Craft Apprentice's Corner

likely to give trouble from shrinkage defects. They do require feeding, but the fact that these alloys may be top-gated simplifies the feeding techniques, since methods such as gating through the feeder can often be adopted. The opposite is the case with manganese-bronze (high-tensile brass) and aluminium-bronze. Both of these alloys are difficult to cast soundly in the foundry, due chiefly to their high shrinkage and to the presence of aluminium in their composition, and aluminium giving rise to oxide formation and drossing tendencies. It is essential that these alloys be bottom-gated, and only on very rare occasions is it possible to practice gating through the feeder—almost without exception the feeders will have to be placed on top of the casting or at a part of the casting farthest from the gate. Thus in almost every case the metal in the feeder will be the coldest in the mould cavity, with the result that the feeders themselves will have to be enlarged in mass to counteract the temperature loss. Very "hungry" metals these two, and with some castings of awkward design the size and number of feeders required seems so large as to appear out of all proportion to the casting. However, conditions are such that these feeders *are* required. "Back-pouring" is sometimes practised with these alloys when a job is made with a single top feeder. The idea is to obtain hot metal in the feeder, and when it is decided to use this method the feeding head is built up to a height somewhat greater than the pouring basin. Pouring is done through the pouring basin in the usual way until the metal is seen to enter the feeding head. Pouring is now stopped and the pouring basin sealed off by means of a shovelful of sand, an iron plate, and a weight, as in Fig. 6. Pouring is now completed through the feeding head.

"Molten Sea" in Copper-alloy

One of the wonders of the art of founding in copper-alloy was the "molten sea," used in the sacrificial service which used to take place in the forecourt of King Solomon's Temple. Featured as a great basin to hold 10,000 gal. of water, it was 15-ft. dia., 7-ft. 6-in. deep and had a wall thickness of 3-in. The font rested on the back of 12 young bulls which were cast in solid bronze and then burnished bright, these were grouped in threes and each trio faced a cardinal point. It has been established that the founding took place on the plain of the river Jordan, between Succoth and Zaretha, and that fine clay was used to form the moulds. The core for the basin was built of sun-dried brick and plastered with clay after the manner of bell-founding to-day, whilst the casting of the bulls was effected in casts in clay taken from a clay model, and made in two halves. It would appear that the moulds were fired to harden them and that charcoal from the cedar forests was used in the smelting of the alloy metal. When the basin was filled it weighed about 26 tons. This was indeed a feat of casting in those distant Biblical days.

* The font in the Mormon Temple described in the JOURNAL, September 18, 1958, p. 352, is of exactly the same size and character.—EDITOR.

British Standards Institution

Three standards published this month by the British Standards Institution relate to: (1) The requirements with which articles of industrial clothing must comply before they may be called "flameproof" (B.S. 1547: 1959) Flameproof industrial clothing, materials and design; (2) the performance requirements by which the flameproof qualities of materials may be judged (B.S. 3120: 1959); and (3) the method of test which is to be employed in assessing these performance requirements (B.S. 3119: 1959). Copies of the standards may be obtained from the sales department of the Institution, 2, Park Street, London, W.1; price 3s. each.

Was the First Iron Casting a Lion?

The lion has always been the premier symbolic beast, even in the distant ages before the dawn of heraldry. It symbolized nobleness of nature, courage and generosity. There is, for example, the golden lion of England and the red lion of Scotland, which were shown on the Royal shields. These motifs have been handed down in the form of inn signs and to-day the "Golden Lion" and the "Red Lion" are still much in evidence.

It is of interest to note that the first example of cast iron is reported to be a casting of Chinese origin, representing a recumbent lion. The casting has a base 7½ by 14⅜ by 5½-in., and weighs 26 lb. This cast-iron figure bears the date September 11, AD 502, *i.e.*, it was cast in the third year of the reign of Ching Ming of Great Wei. The technique of casting iron was known before that date in China, and a tax was levied on it *circa* 675 BC. In Great Britain and Ireland, there are many examples of the "king of beasts" in cast iron, dating from the 17th century onwards. In the 18th century, families having a lion on their family crests, also had representations of the beast in cast iron at their columned porticoes.

Marking Off

By Mervyn G. Chadwick

The scribing-block-and-rule, and vernier-height-gauge methods of marking off are compared, and the various advantages and drawbacks of each method enumerated. A modified height-gauge, incorporating an adjustable scriber, is described, and the author concludes by suggesting some improvements in the present-day gauge.

Marking off plays as important a part in industry to-day as it did more than 50 years ago. In foundries and factories where castings are machined it is an essential practice.

Scribing Block and Rule

Advantages

The marker off has two recognized methods at his disposal, namely, a scribing block and rule, and the vernier height and gauge. The former method, although by far the oldest, has two great advantages over the more modern height gauge. In the first place, after the centre line and base line or datum line has been determined, the rule may be adjusted so that either of these lines reads exactly to the nearest inch. This means that it is only necessary to add or subtract the dimensions shown on the drawing to say 5, 6, or 7, inches, etc.; instead of having to add or subtract to or from say 5.642 or 6.642 in., etc. Secondly, most dimensions are given in fractions, and as the rule in use may be marked in both fractions and decimals it is not necessary to convert the fractions into decimals except in exceptional circumstances. In addition, the varying size of blocks used need not be taken into account when using this method, as is the case when using a height gauge.

Drawbacks

So much for the advantages. The drawbacks of this method are as follows. The rule has to be clamped to an angle plate, and, after being set at right angles to the table, has to be moved around the casting with the scribing block. It is not practicable to use a scribing block which will reach to a height of more than about 18 in., which means that a large number of ground blocks have to be used for a casting from 2 to 4 ft. in height.

Vernier Height Gauge

The present vernier height-gauge, up to 4 ft. in height, undoubtedly overcomes the above drawbacks. However, in its present form endless calculations are required because the fractional dimensions shown on drawings have to be first converted to decimals, and then added or subtracted to or from a c/l, base line or datum line of say 7.395 in. Decimal dimensions shown on the drawing also have to be added or subtracted to or from the above figure. From this it will be seen that the scribing-block-and-rule method requires more physical effort to use than the vernier height gauge method, but that the latter requires considerably more mental effort.

Height Gauge with Adjustable Scriber

It follows that an ideal vernier height-gauge would be one marked with decimals on one side and fractions on the other, which units could be used in conjunction with one another. This desirable state of affairs may be brought about by fitting the cursor of the height gauge with an adjustable scriber, this scriber having a movement of just over 1 in. independent of the cursor, and being locked in position by two locking screws.

Using the Scriber

The adjustable scriber is used in the following manner. After the c/l, base line or datum line has been ascertained at say 7.395 in., the cursor is set at 3 in. and the scriber raised and brought down upon slips set at 7.395 in. and locked in position. The c/l, base line or datum line is now 7 in., and fractions or decimals shown on the drawing may now be added to or subtracted from the 7-in. line. To reset the height gauge for normal use the cursor is set to 3 in. and the scriber brought down upon a 3 in. slip and locked in position. Where a large number of similar castings have to be Marked Off the same figures may be used over and over again, thus eliminating the possibility of errors and saving a great deal of time.

Need for Modified Height Gauge

Successful marking off is, of course, dependent upon the experience and patience of the marker off, whichever of the above methods are used. When one considers that a scribing block and a 3 ft.-rule cost less than £5, and that a 48-in. vernier height gauge costs well over £100, those interested in overhead costs would do well to consider asking the manufacturers of these instruments to provide a height gauge that will save hours of unnecessary mental calculation. In its present form the height gauge is marked in decimals and mm., or decimals. The metric scale is seldom used in this country as most of those engaged in marking off prefer to convert into decimals, with which they are more conversant.

Conclusion

In conclusion it is evident that, although height gauges were produced many years ago, and changes in design have taken place, nothing has been done to ease the lot of the marker off. He still has to deal with endless figures, and, although he may be concerned with a large batch of similar castings he is obliged to make fresh calculations for each one, which necessitates endless figure- and paper-work.

Bid for British Timken, Limited

A deal which would bring $30,500,000 to the UK was announced on April 14, when it was revealed that the Timken Roller Bearing Company, of Canton, Ohio, has offered to buy the 2,337,500 ordinary £1 shares of British Timken, Limited, which it does not already own.

Its present holding is 2,662,500. The proposed price is 83s. 9d. per £1 share ex the 10 per cent. dividend, now announced, for 1958.

This part of the deal is worth almost £9,800,000. It is conditional upon acceptance by holders of not less than 75 per cent. by number or of 90 per cent. by value of the minority shares and to appropriate consents by the British Government authorities. If the deal is completed Timken Roller Bearing is to repay at 22s. 6d. each the 1,000,000 4 per cent. cumulative redeemable preference £1 shares in British Timken.

In addition, the US directors have authorized the British board to state that the proposed purchase will not adversely affect the existing staff either at home or overseas and that they intend the business to continue under the existing British management.

Speaking on the reasons for the deal, Mr. William Umstattd, president of the American company, said: "We felt that we could more effectively cope with competition if we purchased the shares of British Timken."

Publications Received

Friction Charts for Air Flow in Straight Ducts and Pipes, by R. H. Young & J. M. Gasiorek. Published by the Sturtevant Engineering Company, Limited, Southern House, Cannon Street, London, E.C.4; price 7s. 6d.

This publication consists of a set of charts, initially derived for internal use, now made generally available as it became obvious that they were of distinct use to engineers working in the heating and ventilation fields. All told there are seven graphs which are covered by explanatory notes.

Press Bending, by G. E. Hart. Published by Chamberlain Industries, Limited, Staffa Road, Leyton, London, E.10.

Whilst this 38-page booklet is primarily addressed to users of Staffa machines, much of it is of equal value to those handling other makes of machines. The seven chapters of the book cover the fundamentals of press binding; details of the Staffa machine; repairs and maintenance; the application of accessories; how to make "offsets" in varying angles of bend, and, finally, technical data. Users of the Staffa-type of benders will find this booklet invaluable.

House Organ

Close-up No. 13. Issued by Armstrong Whitworth (Metal Industries), Limited, and Jarrow Metal Industries, Limited.

This issue has had a spring clean with very pleasing results; the type lay-out and choice of material all show improvement on previous issues. This number features on the cover Mr. Lodewyck Van Boeckel, who though really a wrought-iron smith, works as a marker-out. The picture in the catalogue of a door he has made shows great artistic merit.

New Foundry at Que Que

A factory building in Germiston, South Africa, is being completely dismantled and will be sent by train for re-erection at Que Que, Southern Rhodesia. Formerly used by Carron, Limited, of Germiston, it became redundant when the company merged last year with City Engineering Works, of Pretoria. After its 700-mile rail journey the building will be re-erected on a 13½-acre site at Que Que to house the new foundry of City Engineering & Carron, Limited, which will make porcelain enamelled baths and basins, cast-iron sanitary ware, pipes and fittings. The factory site has been cleared and a start is now being made on the foundations, ready for the arrival of the building itself from Germiston. Machinery from Germiston and Pretoria and also new equipment from overseas will be installed as soon as the building is complete. Production is expected to begin this year.

ECSC Output of Pig-iron and Coal

Production of crude steel (ingots and castings) in the six countries of the European Coal and Steel Community in March rose to 4,864,000 tons, compared with 4,495,000 tons in February. Output is still, however, well below the 5,217,000 tons recorded for March, 1958.

Output of pig-iron and ferro-alloys in March reached 3,683,000 tons, compared with 3,339,000 in February and 3,869,000 tons a year ago.

Coal showed a comparatively small tonnage rise for March. Provisional figures issued by the Statistics Division of the High Authority showed March output at 19,870,000 tons, compared with 19,101,000 tons in February and 21,926,000 tons in March, 1958.

ECGD Cover for Trade with Egypt

Following conclusion of the financial agreement between the United Kingdom and Egypt, the Export Credits Guarantee Department has established adequate sources of status information on Egyptian buyers, and is resuming cover for trade with Egypt forthwith.

Cover will apply, according to the type of policy, to contracts or to shipments made after April 20, but holders of comprehensive guarantee policies giving cover from date of contract are given the opportunity of offering for cover all eligible contracts in hand but not yet shipped on April 20: ECGD will not however be liable for loss arising from an event or cause of loss before that date. Contracts outside the field of the comprehensive guarantee will be considered for cover on their individual merits.

Nickel Exhibition in Sheffield

A private exhibition is being staged by the Mond Nickel Company, Limited, at the Cutlers Hall, Sheffield, from June 2 to 5, featuring the properties of nickel, nickel alloys, platinum metals and s.-g. iron.

The exhibition will be divided into sections dealing with mechanical and physical properties, corrosion-resistance, electrodeposition, strength at high temperatures, toughness at sub-zero temperatures, and welding. These main sections are further sub-divided and include demonstrations as well as specimens of materials. Each day a number of technical films will be shown relating to various aspects of the exhibition and a wide range of technical publications will be available.

Notes from the Branches

Northampton Section

The Northampton and district section of the Institute of British Foundrymen met at the Plough Hotel, Northampton, to hear a lecture on "Shell Moulding" by Mr. D. H. Scott, foundry manager of E. Green & Son, Limited, Wakefield, Yorks. The company manufactures a wide range of fuel economizers and heat exchangers which consist mainly of gilled sleeves and tubes in low-phosphorus iron, and in adopting the shell-moulding process for these castings Mr. Scott said the company had gained considerable advantage. The average weight of shell-moulded castings produced per week was 60 tons. The lecture was well illustrated by a 16 mm. film taken in Mr. Scott's foundry, and a number of coloured slides were also used to bring out the main points of the film.

Mr. Scott continued by saying that the company had designed and manufactured automatic shell-moulding and coremaking machines to produce their own particular type of castings. One automatic shell-coremaking machine was producing cores at the rate of 250 to 300 cores per hour, this being a five-station machine with electrically-heated coreboxes. From this machine cores were delivered on a conveyor belt and the evacuated sand was automatically returned to the main hopper by compressed air.

Shell moulds were made on fully-automatic moulding machines of British manufacture, producing a shell 30 by 21 in. which, when broken into four sections, produced four castings. The arrangement was such that the machine operator assembled and glued the two half shells together by using the residual heat of the shell plus powdered resin. Pressure was applied by means of a four-inch pneumatic cylinder for 10 secs., the shell then being ready for metal to be poured in. Due to the design of the castings 90 per cent. of the resin in the shell was burnt out, thereby making the reclaiming of the sand an easy proposition.

Sand Reclamation

A plant for pre-coating of sand was another of the innovations which Green's had made to bring down the cost of the process. In this plant the mill was fed by two hoppers, one containing reclaimed sand and the other new sand. The proportion of sand used was 75 per cent. reclaimed to 25 per cent. new; due to the type of work on which the pre-coated reclaimed sand was used, it was reclaimed only once. Although the majority of the shell-moulded castings made averaged 11 lb. in weight, castings weighing 5½ cwts. and 12 ft. long were also produced on a production scale. The mould for these was made by assembling 2-ft. sections of shells, in a jig, whereupon the moulding box was closed over, and backed up with green-sand using a Sandslinger.

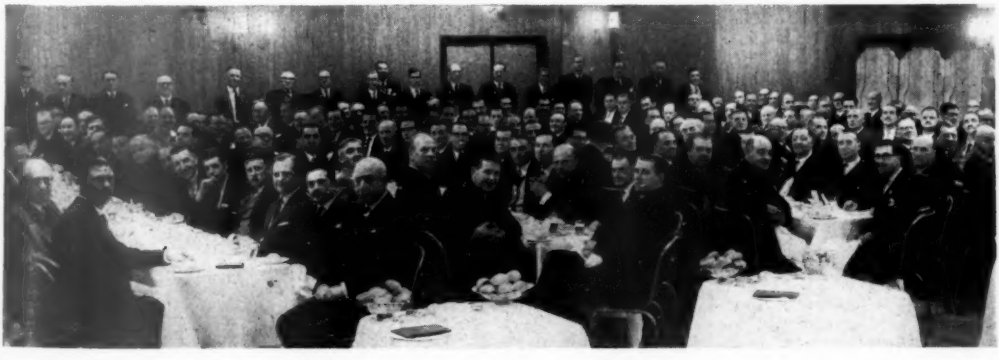
When asked about reclaimed sand, Mr. Scott said sand reclamation was definitely a process which could bring down the cost of shell moulding. When using a proportion of reclaimed sand, extra shell strength was obtained, due, in his opinion, to the resin adhering to reclaimed sand better than new silica sand. It was pointed out that the particular job in question, weighing 11lb., was being produced at a price equal to green-sand moulding, and the finish was better. Although in this particular instance it was not necessary to have the finish usually produced by shell moulding, this had been achieved on a continuous running line.

Answering a question on the high cost of pattern equipment, Mr. Scott said that if a job was worth shell moulding, then for such a casting it would be necessary to manufacture metal pattern equipment for green-sand moulding—the difference in the two prices was determined by the standard the customer required on his castings.

Australia (Victoria)

The first general meeting this year of the Australia (Victoria) branch was held in the Metallurgy School, Royal Melbourne Technical College, on March 18. At the completion of the business of the meeting three films were shown entitled "Wheel and Axle"; "Shell Process comes of Age"; and "Story of Volclay." Members then discussed the films and the meeting concluded in the usual way with a light supper.

IBF London Branch "Men Only" Dinner. *The illustration shows part of the gathering of over 200 members and guests who were present at the IBF London branch "Men Only" dinner, held at Lyons Corner House, Tottenham Court Road, on the evening of April 3. Mr. L. A. S. Harbourne was MC, and the function was organized by Mr. W. R. Buxton.*



New Catalogues

Industrial Photography. Kodak, Limited, Kodak House, Kingsway, London, W.C.2, have issued three beautifully-illustrated catalogues. The most brilliant of these is "Photography in Industry and Commerce." It is so convincing that it makes one wonder how even the smallest foundries can operate without the use of some photographic equipment; those with any pretentions to size should, of course, have a photographic department. The second catalogue is called "A New Easier Way to make Beautiful Colour Prints" and the third carries the title "Kodak Negative Naturals for Professional, Commercial and Industrial Photography." Praise must be also accorded to the printers of these brochures.

Recuperators for Hot-blast Cupolas. A four-page leaflet issued by Fuel and Metallurgical Processes, Limited, Normanhurst Chambers, 21, St. James Road, Dudley, Worcs., is an interesting technical document as it deals first with steel recuperators, which are the speciality of the issuing house, and finally with four types of applications. In between, there is a dissertation on recuperator types and principle of operation. With this catalogue came a second one dealing with recuperators for industrial furnaces.

Walsall—The Town of 100 Trades. Published by Walsall and District Chamber of Commerce, Walsall. Amongst the 100 trades claimed in the title of this well-produced brochure, the manufacture of malleable castings is amongst the most important. This is stressed by a special article written by Mr. H. G. Hall on the subject. Included is an abridged buyers' guide in four languages. The major part of the brochure is taken up with advertisements of the local firms; but there is not, as there should be, an index of these names.

Investment Castings. An interesting brochure has been received from Trucast, Limited, Farnham Royal Lodge, Buckinghamshire. It covers, by letterpress and well-chosen illustrations, the company's modifications of the age-old lost-wax process. No exaggerated claims for the company's method have been put forward, and, on the penultimate page, a number of sensible hints to designers are set out in a form any engineer should appreciate.

Overhead Cranes. From the Clayton Crane and Hoist Company, Limited, Irwell Chambers East, Union Street, Liverpool 3, has been received catalogue No. 4,958 covering a wide range of standard and "tailor-made" overhead cranes. It is a spiral-bound brochure, and in a series of 32 full-page illustrations several foundry installations are shown. Excellent use has been made of colour printing. The list of users printed on the first inside cover is indeed imposing.

Drum-handling Equipment. In publication DBC4 Powell and Company, Burry Port, Carms, South Wales, describe and illustrate a wide range of plant designed specifically for handling drums, barrels, gas cylinders and a host of similar jobs—there is even a skid for taking drums to higher level. It is the sort of catalogue that should be included in every library of trade literature.

Sprav-blast Oil-coolers. In publication No. 591, the Visco Engineering Company, Limited, Stafford Road, Croydon, Surrey, give some interesting information for the heat-treatment departments of the steelfoundry industry, as the method disclosed offers a medium between oil- and water-quenching.

Book Review

Modern Pearlitic Malleable Castings Handbook. Issued by the Malleable Research & Development Foundation, Granville, Ohio, U.S.A. *Gratis* to approved applicants.

The Foundation was inaugurated in 1956 by six leading American malleable iron foundries to promote technical progress. This book is the Foundation's first step in obtaining and disseminating new and useful engineering information on pearlitic malleable-iron and as such is an excellent example of the way co-operative effort amongst competitors can whet the appetite of engineers and designers for a relatively new material, and stimulate technical progress. The overall effect will be an increased demand for this material and a larger market to be shared between the producers. British malleable ironfounders could learn a worthwhile lesson from the background and publication of this handbook.

The production of pearlitic malleable is covered in the first six pages of the book, the information is rather over simplified, but it must be remembered that this material has been produced in America for the last 20 years or so, and that the methods outlined are the culmination of the research work of those years, and, therefore, represent the latest and most up-to-date production techniques. The use of silicon contents of the high order quoted and of heat-treatment furnaces specially designed to meet production of this material, are by no means common in the UK, nor is the production of air-quenched or liquid-quenched pearlitic malleable.

The chapter on design will surely intrigue the modern engineer and the various facts, figures and properties reported in the next chapter will encourage his desire to use this material, particularly after studying some of the comparisons made between the properties of pearlitic malleable and those of steel. Of especial interest is the section dealing with impact data. This will be new information to many engineers and designers and will undermine their confidence in the value of IZOD and Chary Impact tests if these are obtained only at room temperatures. It is, however, a little difficult to follow the arguments presented in favour of pearlitic malleable, which has a relatively high impact transition temperature. The section dealing with hardenability and giving examples of induction hardening, well illustrates the versatility of this material.

It seems a pity, however, that the rather full discussions on the various physical and mechanical properties are not clarified, by the inclusion in this book, of a detailed résumé of American specifications for pearlitic malleable, listing the minimum properties demanded and typical properties obtained in practice.

Nevertheless, the Malleable Research & Development Foundation is to be congratulated on the production of a worthwhile handbook which enables the designer and engineer to compare this almost unique ferrous material with steel and spheroidal-graphite or nodular cast irons of equivalent high strength and comparable ductility. A study of this handbook will prove beyond doubt that pearlitic malleable-iron cannot be overlooked or ignored by the modern designer and this alone will compensate the Foundation for an immense amount of co-operative work.

H. HALL.

THE THIRD STAGE of the expansion of the laboratories of the British Non-Ferrous Metals Research Association at Euston Street, London, N.W.1, is now completed and on May 13, Sir Alexander Fleck is to open the new west wing.

American Letter

Magnesium-casting Design*

Good design implies a structure which gives best service performance with least weight, whilst still retaining the capability of being cast at good production rates. Material is chosen which has mechanical properties adequate to sustain the required critical loads, taking into account their mode, direction and rate of application under expected operating conditions. A good casting design is one which comes as close as possible to allowing all portions of the structure to equally share in supporting or distributing the load on the casting. Of great assistance to designers in light metals is the relatively large amount of mechanical-property data which is available.

Two Major Problems

Two major problems must be considered: (*a*) How to accurately predict service-loading requirements, and (*b*) how to predict serviceability from the available mechanical-property data. Variables effecting these problems include: the effects of porosity; grain-size; heat-treatment; surface smoothness, and stress concentration. A good casting design is one which gives the foundryman the chance to achieve uniformly-high properties throughout the whole casting, while still maintaining the rates of productivity that he is required to meet. Present-day casting design, as it has developed over the years with the heavier metals, has tended toward the use of the thinnest sections that castability will allow, the sections being made and strengthened by the addition of ribbing systems. The disparity in mechanical properties that exists between test-bars, and test-pieces cut from the actual castings, demonstrates how much improvement could result if more-uniform cast structures, similar to test-bar structures, could be obtained in castings.

Magnesium versus *Heavier Metals*

Mechanical-property data have proved that magnesium may be used in many applications on an equal-volume basis with heavier metals, with a consequent saving in weight. Most magnesium sand-castings are sufficiently massive to make the lower modulus of elasticity of magnesium a minor problem only. The avoidance of stress concentrations by the adding of wall thickness rather than ribs is in accordance with the recommended practices for generous filleting. Other recommended practices are: (*a*) The use of a large number of fasteners modestly loaded, rather than a few fasteners heavily loaded; (*b*) the use of longer studs or through bolts; (*c*) avoidance of sharp corners, particularly around bosses, and (*d*) the use of alloys of magnesium having heat-treatments which provide maximum toughness, rather than only highest strength and maximum hardness. Possible applications for magnesium castings are in: a crankcase for a 12-cylinder aircraft engine; an aircraft camshaft housing; an aircraft wheel, and various electronic chassis components.

Ideal Design

The designer's ideal is the avoidance of stress-concentrating features without the penalty of excessive weight from built-up wall thicknesses, and simple functional design without re-entrant sections in complicated load-distributing patterns. The foundryman's ideal design is one having uniform, relatively-thin sections, where feeding problems are simple, walls are without abrupt changes in thickness or directionality, and metal flow and solidification can be controlled without the complication of elaborate feeding and risering systems. The optimum design is one where the service performance may be described and related to available mechanical-property data. The resulting structures may then be evolved into configurations which allow good foundry practices.

* Synopsis of a paper by G. H. Found, who is senior staff member, engineering division, Arthur D. Little, Inc., Cambridge, Massachusetts. This paper was prepared when the author was general manager, Saginaw Bay Industries, Inc., Bay City, Michigan.

Possibilities of Increased Anglo/Soviet Trade

Raising of the embargo on some items of British exports to the USSR came too late, said Sir Greville S. Maginness in his presidential address at the annual meeting of the Russo-British Chamber of Commerce on April 16. The Soviet Union had had to develop its own production of many types of machine tools, oilwell drilling and exploration equipment, electric motors, compressors, and various electronic items and some were being produced now in sufficient quantity for export. A further time-lag in deleting other items still on the list was likely to have the same result.

Sir Greville, who is chairman of the Churchill Machine Tool Company, Limited, emphasized the importance to British exporters of the extensive and ambitious development of Soviet industrial capacity and the opportunities afforded to makers of specialized mechanization and automation equipment in a large number of fields.

Two-way deals and increased credit facilities were other methods by which Anglo-Soviet trade could be stimulated, and he understood negotiations were going on for very large orders for equipping complete industrial enterprises.

Indian Oxygen Expansion Programme

Completion is announced of loan arrangements involving a total equivalent to £562,500 between the Commonwealth Development Finance Company, Limited, the Industrial Credit & Investment Corporation of India, Limited, and the Indian Oxygen & Acetylene Company, Limited, a subsidiary of the British Oxygen Company, Limited.

The loan is to meet part of the capital cost of a replacement and expansion programme planned to be completed in 1960 amounting to over £2,000,000. The balance of the cost is being financed by Indian Oxygen and British Oxygen. The aim is to provide additional capacity to enable Indian Oxygen to meet the increased demands for its products expected to arise from the current industrial development in India and in particular the expansion of steel production in the second five-year plan. The greater part of the loan will be used in connection with the purchase of plant and equipment manufactured in the UK.

STEWARTS AND LLOYDS, LIMITED, announced on April 15 that it has negotiated two contracts with the Soviet Union. One is for £460,000 worth of boiler and steam tubes and the other for £383,000 worth of oil-well tubing. Much of the total of 9,600 tons involved will be produced at Corby. Shipments of the boiler and steam tubes will take place in May, June, and July, while 300 tons of oil-well tubing will be shipped in between four and six weeks' time, the remainder in shipments of 300 tons per week.

Personal

Mr. RALPH CHILES has been appointed chairman of the Longclose Engineering Company, Limited, a subsidiary of Stone-Platt Industries, Limited, in succession to Mr. E. WARWICK BROADBENT, who has retired from the board.

Mr. C. H. TANNER, a director of F. W. Berk & Company, Limited, has been elected vice-chairman. Mr. C. R. F. BERK becomes a managing director, and two new directors, Mr. B. E. MILEHAM and Mr. F. A. RIVETT, have been appointed to the board.

Mr. D. R. VICKERS has been appointed an assistant secretary of the British Standards Institution with responsibility for administering the Institution's certification mark schemes and dealing with consumer-goods activities with special reference to the Consumer Advisory Council and the women's advisory committee.

Mr. A. G. GILBERTSON has been appointed managing director of the Brown, Lenox group of companies, and chairman of Brown, Lenox & Company (London), Limited. Mr. Gilbertson joined Brown, Lenox & Company, Limited, in 1949 as a director of that company, and of Brown, Lenox & Company (London), Limited.

Mr. K. M. TAYLOR, sales controller at Raleigh Industries, Limited, and Mr. B. D. HAYES, consulting engineer for the Nottingham area of Sir W. H. Bailey & Company, Manchester, have been awarded 1959 Nottingham Roosevelt Memorial Travelling Scholarships. With one other winner, they are expected to start for a tour of the United States in August.

On attaining retirement age, Mr. W. HOBBS has resigned as joint secretary of the British Motor Corporation, Limited, and Mr. E. PRICE has been appointed in his stead. Mr. Hobbs will continue as a director of BMC and Morris Motors, Limited, and Mr. Price will retain his position as deputy chairman of Fisher & Ludlow, Limited, a subsidiary of BMC.

MR. L. ROTHERHAM, member for research of the Central Electricity Generating Board, has been co-opted to the council of the British Welding Research Association. Mr. Rotherham, who was chief metallurgist and director of research and development of the UK Atomic Energy Authority (Industrial Group) from 1950 to 1958, is a member of the Scientific Advisory Council of the Ministry of Power and of the general board of the National Physical Laboratory.

Mr. J. A. BARKE has been appointed director of product divisions of the Ford Motor Company, Limited. Mr. H. H. JEFFRIES has been appointed director of manufacture. Mr. Barke joined the company in 1932. He is a director and general manager of Briggs Motor Bodies, Limited, and a director of British Indestructo Glass. Mr. Jeffries, who also joined Ford in 1932, is a director of Henry Ford & Son, Limited, Cork.

Mr. A. H. HIRD has been appointed to the board of the English Steel Corporation, Limited. He is a director of Vickers, Limited, and a number of its subsidiaries, and has many past associations with English Steel, particularly in the development of its business in forged-steel boiler drums and forgings for electrical power generation. Mr. Hird was attached to the staff of English Steel during the early years of the last war.

Mr. J. A. HARDY, technical director of Wm. Doxford & Sons, Limited, engineers and shipbuilders, etc., of Sunderland, has retired after 42 years' service with the company. He is continuing with the company as a consultant and at the end of the month will visit the US. During a stay of several weeks in Seattle he will act as a consultant to a number of American shipping companies whose vessels are fitted with Doxford engines.

Mr. G. S. STEVEN, managing director of Allied Ironfounders, Limited, since October 1956, has been elected vice-chairman. Mr. H. C. WILSON BENNETTS has been appointed managing director jointly with Mr. Steven. Mr. G. F. WILLIAMS and Mr. C. W. FERGUSON, who have been associated with the Coalbrookdale Company, Limited, and the Durban Falkirk Iron Company (Pty.), Limited respectively for many years, have been appointed directors.

Honorary degrees of LL.D. are to be conferred on two Lanarkshire men, Mr. THOMAS COUGHTRIE, chairman of the Belmos Switchgear Company, Limited, Bellshill, and Professor ROBERT HAY, who retired last month as professor of metallurgy at the Royal College of Science and Technology, Glasgow, and Graham Young lecturer in metallurgical chemistry at Glasgow University. Commemmoration day ceremony in Glasgow University is June 17.

Mr. DAVID G. MAWSON, 21-year-old apprentice of Birmetals, Limited, one of the Birmid Industries group, has been awarded the Hele-Shaw National Certificate Prize for 1958. The prize is an annual award given by the Institute of Mechanical Engineers to the apprentice obtaining the best all-round marks in the higher and ordinary national certificate, with the condition that the candidate has had workshop training. Dr. H. S. Hele-Shaw instituted the prize in 1937.

Mr. G. C. HEPWORTH has been appointed a director of Associated Engineering Holdings, Limited, and has relinquished his position as chairman and joint managing director of its subsidiary, Hepworth and Grandage, Limited. He has been appointed managing director of the engine component division, which has been set up to co-ordinate the operations of the piston and piston-ring manufacturing and distributing companies of the group. Mr. J. L. HEPWORTH has been appointed chairman and sole managing director of Hepworth and Grandage.

Dr. C. J. DADSWELL, director of English Steel Corporation, Limited, Sheffield, and managing director of English Steel Spring Corporation, Limited, and English Steel Castings Corporation, Limited, has been awarded the E.J. Fox Medal of the Institute of British Foundrymen. The award is in recognition of "exceptional services to the Institute and the foundry industry," and will be presented at the Institute's annual meeting at Scarborough in June. Dr. Dadswell is chairman of the British Steel Founders' Association and a member of the Council of the British Steel Castings Research Association.

Alfred Ellison, Limited, announce that Mr. H. HANKS has been elected to the board of directors of the company. Mr. Hanks has served the Ellison companies for 41 years. He joined the late Mr. George Ellison in 1918, and was general sales manager of George Ellison, Limited, for many years until in 1952 he was appointed general manager of Alfred Ellison, Limited. He is an associate of the Institute of Electrical Engineers, a fellow of the Association of Mining, Electrical and Mechanical Engineers, and a member of the executive committee of the National and Midland Ironfounders Association. Mr. E. A. SKINNER, who succeeds Mr. H. Hanks as general manager of the Black Lake Ironworks, West Bromwich, has been assistant general manager since 1955. He served with the production operational research team of the British Cast Iron Research Association from 1951 to 1953.

Company News

DARWINS GROUP, LIMITED, steel and tool makers, of Sheffield—The dividend is being reduced from 12½ per cent. to 10 per cent. for 1958 with a final of 6 per cent., against 8½ per cent. Group trading profit declined sharply from £622,092 to £350,565.

GENERAL REFRACTORIES, LIMITED—At the extra-ordinary general meeting held on April 14 the resolution to increase the authorized share capital from £1,500,000 to £2,000,000 by the creation of a further 1,000,000 10s. ordinary shares was approved.

WILLIAM BLYTHE & COMPANY, LIMITED, industrial chemical manufacturers, of Church Accrington (Lancs)—The ordinary dividend is to be cut from 25 per cent. to 20 per cent., with a reduced final of 15 (20) per cent. Group profits for the past year were lower at £144,689 (£152,371).

RANSOMES, SIMS & JEFFERIES, LIMITED, engineers and ironfounders, etc., of Ipswich—Group trading balance expanded sharply from £304,034 to £574,477 in 1958, and in addition to maintaining the 6 per cent. dividend there is a special 1½ per cent. interim for 1959. The interim will not affect any final which may be recommended for the current year.

PYRENE COMPANY, LIMITED, manufacturers of fire-fighting equipment, etc., of Brentford (Middx)—Group profits expanded sharply from £521,811 to £757,031 in 1958 and the dividend is raised from 25 per cent. to 27½ per cent. with a final of 16¼ per cent. Shares recently issued in connection with the one-for-five rights offer do not participate in the 1958 dividend.

JOSIAH PARKES & SONS, LIMITED, manufacturers of locks and brassfoundry products, of Willenhall (Staffs)—The company is effectively increasing its dividend from the equivalent of 11.07 per cent. to 15 per cent. with a final of 6¼ per cent. for 1958 and a special interim of 3¾ per cent. on account of the current year. Group net profit expanded from £133,107 to £160,268, after tax of £134,739 (£127,369).

PRESSED STEEL COMPANY, LIMITED—Net profits increased by nearly £500,000 in 1958, and the dividend raised by 5 per cent. to 25 per cent. with a final dividend of 17½ per cent. The 1956 dividend was 15 per cent. Profits expanded from £3,508,051 to £4,360,377, and after providing £2,342,779 (£1,980,930) for tax, the net profit of £2,017,598 compares with £1,527,121.

SWAN, HUNTER, & WIGHAM RICHARDSON, LIMITED, ship builders and repairers, etc., of Wallsend (Northumberland)—At December 31, 1958, the value of work in progress of the group was £18,171,844, compared with £16,565,080 at the beginning of the year. Work on hand will keep the shipyards and engine works employed at a reasonably high level for the next two years, but with freight rates depressed the demand for new ships has practically disappeared, Mr. E. J. Hunter, the chairman, points out.

WILLENHALL MOTOR RADIATOR COMPANY, LIMITED—Announcing maintenance of a 30 per cent. dividend with a final of 22½ per cent. for 1958, the directors also propose a one-for-one scrip issue. This will necessitate capitalizing £167,544 of the capital reserve and £7,456 of the general reserve. Profits, before tax, contracted from £170,273 to £128,095 in 1958. An extra-ordinary meeting will follow the annual meeting to consider the capitalization proposals and an increase in the authorized capital from £200,000 to £500,000.

R. W. CRABTREE & SONS, LIMITED, manufacturers of printing machinery, etc., of Leeds—Although the company experienced a setback in 1958 and the current year might not be so good, the chairman, Mr. C. H. Crabtree, says that no difficulty is anticipated in maintaining the 7 per cent. dividend. The company has to face the fact that margins must be smaller, and that there may be temporary setbacks, but as a long-term proposition, he feels satisfied that the company's affairs will continue to prosper. Group net profit for 1958 was £137,097 (£174,922).

PROJECTILE & ENGINEERING COMPANY, LIMITED—The company, which experienced a sharp recovery in 1958, is resuming dividends with a 6 per cent. recommendation. The previous payment was 5 per cent. for 1956. Group net profit of £84,466 compares with a previous loss of £32,620. The directors state that trading conditions during the year were difficult, but many of the problems which confronted the company a year ago have been overcome. In recommending the dividend they state that they gave due consideration to trading results and were mindful of the necessity to conserve resources.

ALFRED HERBERT, LIMITED, machine-tool makers, of Coventry—A modest improvement in orders received from the home and export markets in recent months is reported by Col. C. W. Clark, chairman. The directors stated in the preliminary profit announcement for the year to October 31, 1958, that in the first few months of the current year orders had not been sufficient to justify maximum production, and demand for factories products had been at a lower level than normal. The company's net profit fell to £1,417,976 (£1,821,311) for 1957-58, and that of the group to £1,585,041 (£1,894,904). The dividend is effectively maintained at 6 per cent., tax free.

COLVILLES, LIMITED, steelmakers, etc., of Glasgow—The directors announce that 1,290 holders of the convertible debenture stock exercised their conversion rights in March in respect of £520,550 stock. The directors have accordingly issued and allotted 374,796 ordinary £1 shares. They have also cancelled £520,550 of the debenture stock and the balance now in issue is accordingly £5,479,450 and the number of ordinary shares, 10,374,796. The London Stock Exchange has granted permission to deal in and an official quotation for the additional 374,796 ordinary £1 shares and the necessary arrangements are being made to apply to the other exchanges which already deal in the existing 10,000,000 ordinary shares for similar permissions and quotations.

HAWKER SIDDELEY GROUP, LIMITED—Philip Hill, Higginson & Company, Limited, has announced the basis of allotment for the issue of £15,000,000 5½ per cent. convertible debenture stock, for which applications were received from 28,008 ordinary shareholders for a total of £107,121,106 of stock. As foreshadowed in the offer, the size of applicants' holdings of ordinary shares was taken into account in making allotments above a basic minimum. The allotment is on the following basis:—Holders of one to 50 shares, £50; 51 to 200, £150; 201 to 750, £500; 751 to 2,000, £1,500; 2,001 to 5,000, £3,500; 5,001 to 20,000, £10,000. Holders of over 20,000 shares received allotments of approximately 75 per cent. of their holdings of ordinary shares. In cases where applications were for less than the amounts shown above they were allotted in full.

THE North of Scotland Hydro-Electric Board has placed contracts with the English Electric Company, Limited, for two power stations in its Strathfarrar and Kilmorack scheme, Inverness-shire. The scheme, designed to produce annually 268,000,000 units of electricity, will have two power stations on the river Farrar and two on the river Beauly.

News in Brief

"MACHINERY FOR TEXTILES: THE DEMANDS OF THE INDUSTRY" is to be the theme of this year's annual conference of the Textile Institute to be held at Scarborough from May 12 to 15.

STEWARTS AND LLOYDS, LIMITED, Bilston, opened on April 16 a £150,000 training centre which is part of the company's £16,000,000 modernization and expansion programme. The purpose of the new centre is to train young operatives in the latest advances in steel making.

ENGLISH ELECTRIC COMPANY, LIMITED, announce the opening of a new sub-office at 14, Albert Road, Middlesbrough. Mr. A. R. Johnson, B.SC., is in charge and is responsible to the manager of the English Electric branch office at Newcastle-upon-Tyne, Mr. W. D. M. Lywood.

THE BURNLEY FIRM of Burco Dean, Limited, manufacturers of washing machines, have acquired the Woodbine Mill, Burnley. The factory will be taken over in October, when the firm's subsidiary, Thomas Ashworth & Company, Limited, aluminium and zinc die-casters, will commence to move in.

WILD-BARFIELD ELECTRIC FURNACES, LIMITED, of Watford, will be exhibiting at the *Ve Salon de la Chimie* to be held in Paris from June 16 to 30. Equipment to be shown will include a variety of laboratory muffles, a laboratory resistance-heated vacuum furnace and a vacuum-fusion gas-analyser, model 912.

JOHNSON, MATTHEY & COMPANY, LIMITED, London, E.C.1, has acquired an interest in the important Italian precious metal refining and manufacturing company Metalli Preziosi S.p.A., of Milan. Johnson, Matthey has been working in close collaboration with Metalli Preziosi for a number of years, and some 10 years ago it entered into arrangements with the company with regard to its general representation in Italy.

STANTON IRONWORKS COMPANY, LIMITED, near Nottingham, is increasing the level of output at its Dale spun-pipe plant, from an eight-shift to a nine-shift week. About 350 men are affected and the change, which is due to improved deliveries of spun-iron pipes, took effect from Monday, April 20. The two other spun-pipe plants, at Stanton Works, will continue to work a four-day week for the time being.

Mr. JOHN RODGERS, Parliamentary Secretary to the Board of Trade, on April 16 opened the new national headquarters of the British Cycle and Motor Cycle Industries Association at Coventry. He said that there were many countries still in process of industrialization where a bicycle was the first stage forward in mobility. Coventry owed its pre-eminence in the motor industry to the skills developed by the cycle industry, he added.

THE COMPLETION of the first stage of a comprehensive programme of kiln development and modernization is announced by Thos. Marshall & Company (Loxley), Limited, Sheffield. To mark the event there was an official opening on April 15 of a new oil-fired tunnel kiln for burning hollow fireclay refractories. Dr. A. T. Green, director of research of the British Ceramic Research Association, pushed the first truck-load into the kiln.

THE annual dinner of the Hepworth & Grandage 25 Year Club was held at the Midland Hotel, Bradford, recently, when the 161 members of the Club were welcomed by the joint managing director, Mr. G. C. Hepworth. The toast to "Long Service Employees," proposed by Mr. Jack L. Hepworth, joint managing director, was responded to by Mr. Harry Rhodes who has worked with the company for nearly 47 years. Following the dinner 27 employees received badges for 25 years' service, 12 for 30 years', and two for 35 years' service.

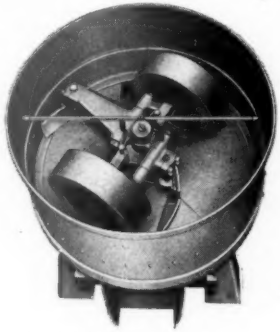
NEWMAN HENDER & COMPANY, LIMITED, Woodchester, are this year sending their mobile exhibition of industrial valves first to Ireland and then to participate in the British Trade Fair at Lisbon. Following the close of the Fair, a three-week tour is to be made in Switzerland; Bavaria will be visited during 10 days towards the end of July. The month of August is being considered as a holiday period, after which September is to be spent with a tour through Austria. Commencing early in October, the final six weeks of the tour will cover Western Germany.

AN EXHIBITION of photometric instruments and microscopes of all types is to be held in the showrooms of Degenhardt & Company, Limited, United Kingdom agents for Carl Zeiss of Western Germany, at 6, Cavendish Square, London, W.1, from May 11 to 21. Throughout the exhibition expert advice will be available on the applications of the instruments and the method of employment. At its conclusion in London the exhibition will be moved to Glasgow where it will open at McLellan Galleries on May 26 and continue until May 29. Amongst the new instruments to be shown is the PMQ II spectrophotometer, designed for extremely rapid quantitative and qualitative analyses of compound substances. Although of advanced design, it is said that it can be operated by personnel with very little training.

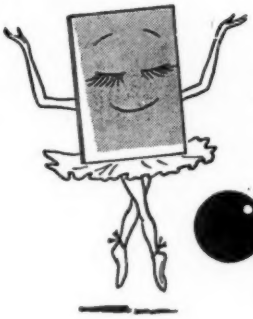
SPEAKING AT A PRESS CONFERENCE in Birmingham on April 15, following a meeting with members of the Birmingham Chamber of Commerce, Mr. J. A. M. Majoribanks, British Economic Minister in Bonn, advised West Midland industrialists to seek bigger shares in West German markets. He said that the value of British exports to West Germany had advanced from £55,000,000 in 1953 to £116,000,000 last year and had increased still further during the past few months. "There is no substitute for a personal visit to the market" Mr. Majoribanks advised and said that the Board of Trade through its trade commissioners and eight consulates in West Germany, would always aid business men with enquiries. One of the great advantages of the German market was the scarcity of import restrictions. More than 99 per cent. of industrial goods were free from licence requirements and tariffs on the whole were reasonable, Mr. Majoribanks added.

THE BRITISH CONSULATE-GENERAL at New York has advised the Export Services Branch of the Board of Trade that Mr. Henry O. Allen, manager of administration, A. O. Smith Corporation, electric-motor division, 531 North Fourth Street, Tipp City, Ohio, is interested in importing from the United Kingdom grey-iron cored castings (for use in the manufacture of electric motors) from one to 30 lb. Of these the US firm would want some ten to 15,000 pieces a year, mostly of 6 to 7 lb. in one or two shipments. Firms interested should write to Mr. Allen, at the address in Tipp City, who will supply further details. It is pointed out that firms in USA and Canada are likely to ignore offers not expressed in dollars and North American weights and measures. It would be appreciated if firms responding to this enquiry would copy their initial correspondence to the British Consulate-General, Commercial Section. 1828, The Illuminating Building. Cleveland 13, Ohio. Any correspondence with the Export Services Branch should be addressed to Lacon House, Theobalds Road. London, W.C.1, bearing the reference number ESB/7816/59.

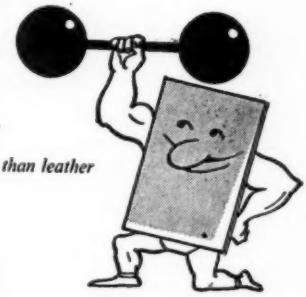
Wait and see the working exhibit of a most efficient sand mill at the Foundry Exhibition: Stand No. 57.



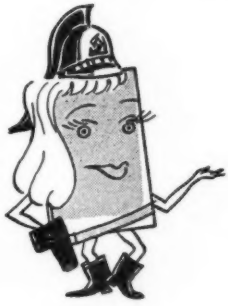
—the Richards' Mull-Mixer. Richards Structural Steel Co. Ltd., Phœnix Iron Works, Leicester.



Light as a feather



... tougher than leather



Fireproof maid ...

Core Tray Chorus

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The Core Tray of the century!
And if you ask me why, good sir,
Here is my inventory:—

Light as a feather, tougher than leather,
Phenomenal trays, these core trays,
Fire-proof made, the finest grade,
Of never seen before trays.

Economical, astronomical,
Tres bon trays, these core trays.
Smooth to lie on, hard as iron,
Last for ever more trays.

And now to the men in the foundry stores,
As the rooks would say, for the good of the cores,
Beware of trays that are nearly right,
Insist on trays of HOOKERLITE.

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Telephone: Swiss Cottage 3281-2-3

Raw Material Markets

Iron and Steel

Business at the ironfoundries continues along familiar lines. Most establishments are striving to secure more work, as their plants are operating much below capacity levels. This applies chiefly to the light jobbing, textile, and some of the engineering foundries. The demand for high-duty castings is steady, and engineering and speciality foundries are in a favourable position compared with other sections of the trade. Those catering for the motor-car industry have had a long run of activity and are able to obtain reasonably good outputs, with prospects of future business showing further improvement.

The light foundries connected with the household equipment trade should continue to benefit from the further purchase tax remissions. The building trade requirements for castings show little improvement, but seasonal demands should shortly bring some expansion. Many of the jobbing foundries, as well as the textile foundries, are badly in need of more work.

The present production of pig-iron is more than adequate for current needs; outputs are controlled at levels more in keeping with demand, but producers of most grades still find it necessary to place tonnages into stock.

Basic pig-iron is plentiful and deliveries to the steelworks provide adequately for current consumption and stock, although present outputs fall much below capacity. The foundries are also well provided with supplies in all grades of iron. The low-phosphorus grades continue in comparatively much greater demand than other irons, but most of the furnaces now producing this grade have tonnages to spare after present demands have been satisfied. A fairly good tonnage of hematite is being taken up, but makers have appreciable stocks despite the fact that production is on a reduced scale. There continues to be a slightly better demand for high-phosphorus irons, but this is insufficient to enable producers to dispose of all of their outputs or to reduce appreciably their large stocks.

The foundries are able to obtain most of their scrap requirements without difficulty, although the call for heavy cast-iron cylinder blocks, and machinery scrap is keen. Foundry coke deliveries are satisfactory and ganister, limestone, and firebricks are readily available.

Although there appears to be some slight improvement in trade at the re-rollers, business generally is very quiet, particularly in the English Midlands, where many of the re-rollers continue to work short time. Home demands for small bars and light sections are only very moderate and export business, apart from some special steels, is negligible, on account of the much lower prices of continental material. Only limited demands for steel semis continue to be made on home steelworks.

Non-ferrous Metals

Buying of copper as a hedge against the possibility of a strike at the end of June in the United States slackened considerably last week, bringing the markets on both sides of the Atlantic under pressure. In the United States the easier conditions resulted in a fall in the custom smelters' price by 2 cents to 32 cents a pound, but on Tuesday a leading custom smelter raised its price by ½ cent to 32½ cents per pound.

In the United Kingdom heavy selling of copper resulted from the weakness of the New York market, and quotations sagged last week by as much as £11 10s. a ton. The undertone is still shaky both in London and in New York, which is due not only to the sudden abatement of demand but also because the figures issued by the Copper Institute in respect of March, for production and consumption were cheerless.

Although the market has firmed up this week in London, and the New York Commodity Exchange is also tending higher, there is the added factor now to contend with of the US Government disposing of copper from its stockpile. The position in this respect is that if, and when, the US Government decides to dispose of any copper in the stockpile, not more than 5,000 tons a month will be released. However, the rate of release will be kept under review to assure consistency of policy, although the US authorities are aware of the danger of disrupting the market or adversely affecting the copper industry by injudicious releases of the metal. A minor feature of the London market was that copper stocks at the end of last week rose to 10,141 tons, which, for the first time, is well above the stocks of tin in official warehouses.

Tin has continued to be quiet with consumer demand erratic. It is believed that the buffer stock manager has stayed out of the market, which has helped materially in keeping the quotation above £780 a ton. In London tin stocks fell further to 9,205 tons. The US price is not much above $1.02 a pound.

Lead has been consistently dull, although the US action to raise the price by ½ cent to 11½ cents a pound at the beginning of this week has infused some life into this market on both sides of the Atlantic. How long this will last is anybody's guess, but with the American recession ended and better weather coming on it is possible that the price might be held this time.

Zinc has also been a quiet market, but the market at the beginning of this week went better in sympathy with the increase in the US lead quotation. The East St. Louis spot price is 11 cents a pound.

Increases in Capital

JOHN SHAW & SONS, WOLVERHAMPTON, LIMITED, increased by £250,000, in 5s. ordinary shares, beyond the registered capital of £750,000.

UNITED GRAIN ELEVATORS, LIMITED, Bootle (Yorks), increased by £40,000, in £1 ordinary shares, beyond the registered capital of £200,000.

EXPANDED METAL COMPANY, LIMITED, London, S.W.1, increased by £425,000, in 5s. ordinary shares, beyond the registered capital of £750,000.

KELBROOK METAL PRODUCTS, LIMITED, Earley Via Colne (Lancs), increased by £10,000, in £1 ordinary shares, beyond the registered capital of £10,000.

CARRIER ENGINEERING COMPANY, LIMITED, London, S.W.1, increased by £500,000, in 5s. ordinary shares, beyond the registered capital of £700,000.

PROGRESS ENGINEERS, LIMITED, Cobridge, Stoke-on-Trent, increased by £13,000, in £1 ordinary shares, beyond the registered capital of £7,000.

BRITISH NORTHROP, LIMITED, engineers, etc., of Blackburn (Lancs), increased by £120,000, in 10s. ordinary shares, beyond the registered capital of £750,000.

E. W. TARRY & COMPANY, LIMITED, engineers, etc., of London, E.C.4, increased by £200,000, in 5s. ordinary shares, beyond the registered capital of £500,000.

MOORE & WRIGHT (SHEFFIELD), LIMITED, tool, cutlery manufacturers, etc., of Sheffield, increased by £100,000, in £1 unclassified shares, beyond the registered capital of £25,000.

H. W. KEARNS & COMPANY, LIMITED, machine-tool makers, etc., of Altrincham (Ches), increased by £150,000, in 5s. ordinary shares, beyond the registered capital of £350,000.

TURNER & SIMPSON, LIMITED, die sinkers, toolmakers, etc., of Birmingham, increased by £20,000, in 19,000 ordinary and 1,000 unclassified shares of £1 each, beyond the registered capital of £25,000.

TUNGUM COMPANY, LIMITED, tungum alloy merchants, etc., of London, W.C.1, increased by £50,000, in 780,000 "A" ordinary and 220,000 "B" ordinary shares of 1s. each, beyond the registered capital of £50,000.

VERSIL LIMITED, boiler and pipe coverers, etc., of Liversedge (Yorks), increased by £80,000, in £1 ordinary shares, beyond the registered capital of £120,000.

QUOD ERAT DEMONSTRANDUM

This is the new Demonstration Bay at Bedewell Works, Hebburn-on-Tyne, equipped with a range of Baker Perkins Foundry Machinery. Here you may see the latest advances in Diaphragm Moulding techniques, together with shot blasting equipment such as the Turbo 60 Rotating Drum, Rotating Barrel and Rotary Table Shot Blast Machines.

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BP/F3

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

April 22, 1959

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £41 0s. 0d. to £43 10s. 0d., scale 15s. 0d. per unit; 75 per cent. Si, £56 10s. 0d. to £60 10s. 0d., scale 15s. 0d. to 16s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 7s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 10s. 11d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £77 0s. 0d. to £81 0s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; over 6 per cent. C, £74 10s. 0d. to £77 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; 2 per cent, C,* 1s. 7½d. to 1s. 10½d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 0.15 per cent. C,* 1s. 9d. to 2s. 0d. per lb. Cr; 0.10 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 9¾d. to 2s. 0¼d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £245 0s. 0d.; 96/98 per cent., £275 0s. 0d.

Ferro-columbium.—65/72 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (home).—78 per cent., £69 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft up to 0.33 per cent. C, £38 10s. 0d.; basic hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £67 10s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £238 15s. 0d. to £239 0s. 0d.; three months, £239 5s. 0d. to £239 10s. 0d.; settlement, £239 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 3½d. per lb.; rods, 250s. 6d. per cwt. basis; 20 s.w.g., 285s. 6d. per cwt.

Tin.—Cash, £783 10s. 0d. to £784 0s. 0d.; three months, £784 0s. 0d. to £784 10s. 0d.; settlement, £784 0s. 0d.

Lead (Refined Pig).—Second half April, £69 15s. 0d. to £70 0s. 0d.; second half July, £71 5s. 0d. to £71 17s. 6d.

Zinc.—Second half April, £74 0s. 0d. to £74 5s. 0d.; second half July, £73 15s. 0d. to £73 17s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £108 5s. 0d.; rolled zinc (boiler plates), all English destinations, £106 0s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £92 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10d. per lb.; sheets to 10 w.g., 196s. 9d. per cwt.; wire, 2s. 7⅞d.; rolled metal, 196s. 9d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £159; B6 (85/15), £198.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £190; HTB2 (38 tons), £200; HTB3 (48 tons), —.

Gunmetal.—BS1400, LG2 (85/5/5/5), £193; LG3 (86/7/5/2), £203; G1 (88/10/2/½), £256; (88/10/2/1), £240.

Phosphor Bronze.—BS1400, PB1 (AID released), £284 per ton.

Leaded Phosphor Bronze.—BS1400, LPB1 (1060), £212 per ton.

Phosphor Bronze Strip, etc.—Strip, 289s. 6d. per cwt.; wire, 4s. 1d. per lb.; rods, 3s. 4d.; tubes, 3s. 4d.; chill cast bars: solids 3s. 3¾d.; cored 3s. 4¾d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 10¼d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 3¼d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 2¼d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 3d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £79 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £229; AB2, — .

* Average 68-70 per cent.

Board Changes

Chairman of the South Wales and Scunthorpe firm of steelmakers, RICHARD THOMAS & BALDWINS, LIMITED, is now Mr. Geoffrey C. R. Eley, following the retirement of Sir Ernest Lever.

When Sir Ernest's impending retirement was announced in November, it was stated that, as a preliminary to taking over from him, Mr. Eley had been elected to the board and was appointed an additional deputy chairman. A director of the Bank of England, Mr. Eley's many business activities include the chairmanship of Richard Crittall & Company, Limited, and directorships of the Hawker Siddeley Group, Limited, James A. Jobling & Company, Limited, the London Electricity Board, Thomas Tilling, Limited, and the British Oxygen Company, Limited. He has held a number of Government appointments from time to time. He is 54.

BENNIS COMBUSTION, LIMITED—Mr. J. P. Lauder and Mr. J. Seymour have been appointed additional directors.

SHEFFIELD WIRE ROPE COMPANY, LIMITED—The company was recently acquired by the Firth Cleveland group of companies. The chairman will in future be Mr. C. W. Hayward, chairman of Firth Cleveland. The other directors will be Mr. E. S. Mead, Mr. R. S. H. Shepard, Mr. G. F. Chambers, Mr. S. K. Wheatley, Mr. H. V. M. Buckler, and Mf. B. Allen.

ATLAS COPCO—Mr. Walter Wehtje has retired from the board and his successor as chairman is Mr. Marcus Wallenberg. Mr. Nils Vult von Steyern, Chief Marshal to the Swedish Royal Court, has been appointed deputy chairman and Mr. Marc Wallenberg, Jr., becomes a member of the board. Before his appointment as chairman in 1957 Mr. Wehtje was managing director for 17 years.

ROTOL, LIMITED—Sir George Dowty and Mr. Robert F. Hunt, chairman and deputy chairman, respectively, of the Dowty Group, Limited, have joined the board. Sir George has been elected chairman and Lt.-Gen. Sir John Evetts deputy chairman. The other members of the board are:—Mr. C. J. Luby, managing director; Col. C. W. King, works director; and Mr. L. G. Fairhurst, technical director. Mr. R. Raff remains secretary. These changes follow the purchase of Rotol by the Dowty Group.

Recent Wills

SMITH, DR. S. L., director of research of the British Shipbuilding Research Association £14,497

DAWSON, JAMES, late chairman of James Dawson & Son, Limited, belting manufacturers, of Lincoln £60,257

ATHERTON, W. H., former engineering director of Lev's Malleable Castings Company, Limited, Derby £29,499

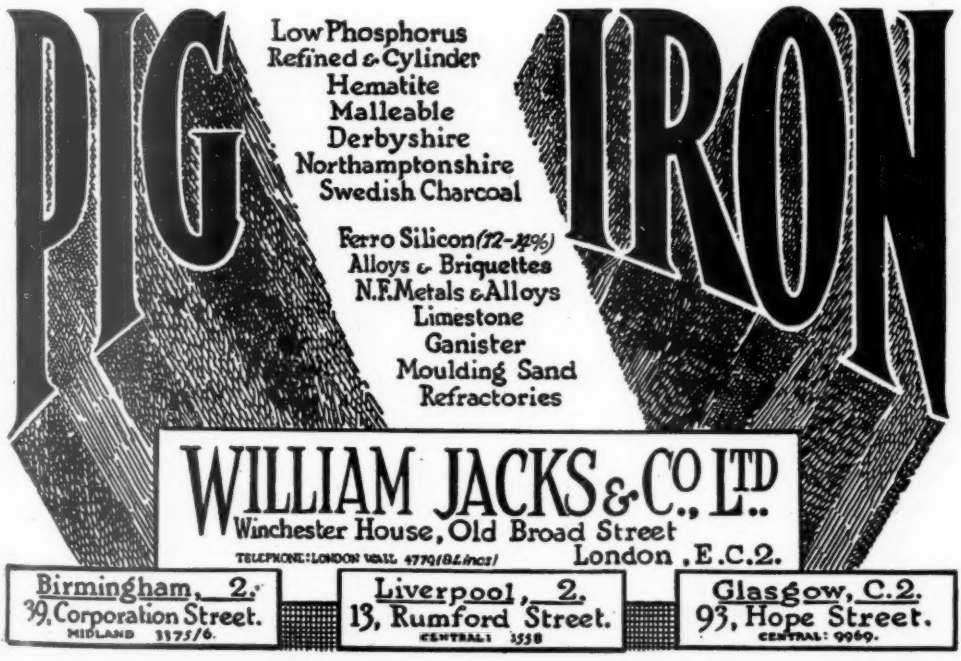
VARLEY, J. S., formerly an executive in the European sales department of the English Steel Corporation, Limited, Sheffield £2,866

DARBYSHIRE, DR. J. A., chief physicist at the Moston factory of Ferranti, Limited, electrical and general engineers, etc. £22,181

THORNTON, J. A., managing director of B. Thornton, Limited, blast furnace and steelworks plant manufacturers, etc., of Turnbridge, Huddersfield £49,312

PARKIN, WALTER, formerly for more than 60 years cashier with Newton, Chambers & Company, Limited, engineers and ironfounders, etc., of Thorncliffe, near Sheffield £1,108

BEHARRELL, SIR GEORGE, former chairman of the Dunlop Rubber Company, Limited, and past president of the Society of Motor Manufacturers, Federation of British Industries, and Institution of Rubber Industry £85,974



CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Numbers 2/6 extra (including postage of replies). Situations wanted 2d. per word throughout.

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

KOLLENGUSS (German) Process (Brass Gravity, Die Casting). Advertiser with expert knowledge this process from scratch wishes contact firms interested. Box KP619, FOUNDRY TRADE JOURNAL.

TECHNICAL SALES REPRESENTATIVE wishes to represent a foundry for grey iron non-ferrous die castings, malleable, on expenses and commission. Very good personal connection in London and Home Counties.—Box TS625, FOUNDRY TRADE JOURNAL.

YOUNG FIRST CLASS IRONFOUNDRY EXECUTIVE desires change. Fully experienced. Foundry Diploma. Good negotiator. Results guaranteed. Box YF634, FOUNDRY TRADE JOURNAL.

FOREMAN PATTERNMAKER, 33, seeks opportunity. Experience wood, metal, plaster, pressurecast, estimating and planning; two years as representative; used to responsibility. Lancs-Yorks area preferred but prepared to move anywhere for suitable position. Box FP632, FOUNDRY TRADE JOURNAL.

YOUNG FOUNDRY MANAGER, A.M.I.B.F., metallurgically trained, desires change. At present in complete control of large foundry of national repute producing specialised castings by mechanised and jobbing methods up to 10 tons weight. Would consider similar position home or abroad with progressive company. Iron, steel, non-ferrous, CO_2, shell moulding, precision casting experience. Ability to build up or modernise existing foundry. Thorough practical and technical knowledge of modern foundry practice. Metallurgical, administration, cost control, production control, etc. Results guaranteed. Replies Box FY635, FOUNDRY TRADE JOURNAL.

STEEL FOUNDRY REPRESENTATIVE, resident Birmingham, experienced carbon and alloy steel castings, extensive connection in Midlands & Southern half England, desires change, offer invited from reputable foundry company. Box SF533, FOUNDRY TRADE JOURNAL.

REPRESENTATIVE hitherto handling quality steel, iron, alloy castings, London and Home Counties, seeks similar representation. Salary/commission/expenses alternatively commission/expenses basis. Box RH615, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

REQUIRED, IRONFOUNDRY OR STEEL REFRACTORY METALLURGIST with drive and initiative. Direct personal sales and representatives. West Riding. North of England resident. Foundry steel work, sands, plastic and rammed linings. Excellent working conditions, progressive post. State educational, technical and commercial experience, if any, terms required, when available. All applications without exception treated in strictest confidence. Box RI620, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

METALLURGICAL CHEMIST required in West Wales. Experience in non-ferrous essential. Submit age, details experience and salary required to Box MC627, FOUNDRY TRADE JOURNAL.

EXPANDING pressure and gravity light alloy diecasters South London area require a live and fully experienced ASSISTANT to WORKS MANAGER. Ample scope for promotion. Knowledge of production control and costing an asset. State full details experience, in confidence and salary expected. Box EP624, FOUNDRY TRADE JOURNAL.

METALLURGIST (production) required for modern stainless steel foundry in Midlands. Preferably experienced and of H.N.C. standard. Must have experience in radiography. Replies giving age and details of experience, qualifications and present salary, in confidence to Box MP609, FOUNDRY TRADE JOURNAL.

SALES ENGINEER. Required by Abrasive Wheel Manufacturer of international repute in the Midland area. Knowledge of grinding operations in foundries, drop forge, welded steel fabrication and allied trades desirable. Aged 30-36. Excellent prospects, Pension and Bonus Schemes in operation. All replies will be treated in confidence. Box SE618, FOUNDRY TRADE JOURNAL.

STEEL FOUNDRY SUPERINTENDENT required for Australia for Electric Steel Foundry producing castings, both machine and jobbing up to 12 tons weight. The position calls for a Journeyman Moulder with higher qualifications, able to handle men and organise production and only top level persons should apply. Applicants will be interviewed in the United Kingdom. Accommodation is available in modern house. Applications in writing giving fullest personal particulars, industrial experience and references, which will be treated with confidence to: Box SF621, FOUNDRY TRADE JOURNAL.

GRAVITY DIE FOUNDRY FOREMAN required. Staff position, Pension Scheme and good canteen facilities. Apply: THE GENERAL MANAGER, THE PREMIER ALUMINIUM CASTING CO., LTD., Beehive Works, Old Birchills, Walsall, Staffs.

A GENERAL MANAGER is required for a Company producing precision investment castings. Metallurgical and technical experience in one of the well known processes is essential. The Company is one of the larger independent foundries in the country, producing castings for aircraft and other industrial undertakings. The position offers very good prospects to a man possessing the necessary qualifications, ability and managerial experience; age between 32 and 40. Applicants should state age, full details of qualifications and experience, and salary required.—Box AG613, FOUNDRY TRADE JOURNAL.

IRON FOUNDRY, near Glasgow, require the services of a METALLURGICAL CHEMIST, 19/24 years of age. State full particulars of experience, age, salary, etc. Box IF611, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

WORKS MANAGER. Box No. 143, WM. PORTEOUS & CO., Glasgow. Advertiser intimates that this post has now been filled and wishes to thank all applicants.

MANAGER of experience wanted to take charge of small well set-up ferrous and non-ferrous foundry, West of London. Opportunity to build up the business and prospects of acquiring financial interest are open to the right man. Box ME630, FOUNDRY TRADE JOURNAL.

TECHNICAL SALES REPRESENTATIVE required for Midlands area by large repetition and jobbing iron foundry situated in West Midlands. Box TS633, FOUNDRY TRADE JOURNAL.

YOUNGISH man required as ASSISTANT FOUNDRY MANAGER for West Midland Ironfoundry. Experience of Shell Moulding an advantage. Write stating age, experience and salary required. Box FM607, FOUNDRY TRADE JOURNAL.

PATENT

THE PROPRIETOR of BRITISH PATENT No. 742151, entitled "Industrial Heating Furnaces," offers same for licence or otherwise to ensure practical working in Great Britain.—Inquiries to SINGER, STERN & CARLBERG, 14 E. Jackson Blvd., Chicago 4, Illinois, U.S.A.

AGENCY

SALES AGENCY, established over 25 years, with Stockport, Cheshire, office. Can accept further agency. Box SA636, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED

REQUIRED urgently. TWO Coleman Core Blowers. R.2. Type. Apply Box RU629, FOUNDRY TRADE JOURNAL.

WANTED. A number of Cast Iron or Steel Circular Moulding Boxes, from 4-8 ft. diameter, also a number of fire bricks sufficient to re-line a cupola to 24 in. inside diameter. Box WA635, FOUNDRY TRADE JOURNAL.

WANTED. Two Cupolas. Melting rate 4 to 5 tons per hour, complete with Spark Arrestors (either wet or dry type) and Skip Hoist charging. Details to OUZLEDALE FOUNDRY CO. LTD., Long Ing, Barnoldswick.

WANTED. Herbert Morris Mulbarn Sand Mixer. Rotary Furnaces, 5-T. and 15-T. copper capacity. Cupola 4 ft. 6 in. shell.

S. C. BILSBY & CO.,
Hainge Road, Tividale, Staffs.
'Phone: TIPton 2448.